Bobar Landscape Project
Appendix A

Silvicultural method/Yarding systems/Fuels management

BOBAR
TABLE 1
Proposed Action

November 19, 2002 Full Road Construction

Unit	Unit Acres	Silivi Method 1/	Yarding System			Fuels Mgt 2/	Volume Cut / Acre (range)(mbf)	Volume Cut / Unit (range)(mbf)
			Crawler	Cable	Aerial			
1	21	P			21	HP/UB/SL	3 - 5	60 - 100
2	12	P			12	HP/UB/SL	3 - 5	36 - 60
3	14	P			14	HP/UB/SL	3 - 5	40 - 70
4	18	P			18	HP/UB/SL	3 - 5	50 - 90
5	4	P			4	HP/UB/SL	3 - 5	12 - 20
6	9	P			9	HP/UB/SL	3 - 5	27 - 45
7	27	P			27	HP/UB/SL	3 - 5	80 - 135
8	6	DDF			6	HP/UB/SL	3 - 5	18 - 30
9	19	P	8		11	HP/UB/SL	3 - 5	57 - 95
10	12	P	10		2	HP/UB/SL	3 - 5	36 - 60
11	71	DDF	5	44	25	HP/UB/SL	6 - 10	426 - 710
12	16	DDF			16	HP/UB/SL	6 - 10	96 - 160
13	23	P/DDF			23	HP/UB/SL	3 - 5	6 - 10
14	14	DFP			12	HP/UB/SL	4 - 7	90 - 160
15	5	DDF			5	HP/UB/SL	4 - 7	35 - 56
16	2	DDF			2	HP/UB/SL	6 - 10	84 - 140
17	31	DFP/P			31	HP/UB/SL	4 - 7	20 - 35
18	173	DDF	12	61	100	HP/UB/SL	4 - 7	8 - 14
19	74	DFP/DDF	5		69	HP/UB/SL	6 - 10	186 - 310
20	45	DFP/DDF			45	HP/UB/SL	6 - 10	1,038 - 1,730
21	2	P			2	HP/UB/SL	6 - 10	444 - 740
22	2	P			2	HP/UB/SL	4 - 7	180 - 315
23	3	P			3	HP/UB/SL	3 - 5	6 - 10
24	44	DDF			44	HP/UB/SL	3 - 5	6 - 10
25	12	DDF			12	HP/UB/SL	3 - 5	9 - 15
26	10	P		6	4	HP/UB/SL	6 - 10	264 - 440

Unit	Unit Acres	Silivi Method 1/	Yarding System			Fuels Mgt 2/	Volume Cut / Acre (range)(mbf)	Volume Cut / Unit (range)(mbf)
			Crawler	Cable	Aerial			
27	11	DDF	1		10	HP/UB/SL	4 - 7	48 - 72
28	20	P/DDF	2	10	8	HP/UB/SL	3 - 5	30 - 50
29	39	DFP/DDF/ P			39	HP/UB/SL	6 - 10	66 - 110
30	41	DDF			41	HP/UB/SL	6 - 10	120 - 200
31	6	DDF			6	HP/UB/SL	4 - 7	156 - 273
32	18	DDF			18	HP/UB/SL	6 - 10	246 - 410
33	20	DDF			20	HP/UB/SL	3 - 5	18 - 30
34	11	DDF		8	3	HP/UB/SL	3 - 5	54 - 90
35	1	DDF			1	HP/UB/SL	4 - 7	80 - 140
36	18	DDP			18	HP/UB/SL	4 - 7	44 - 77
37	2	DDF			2	HP/UB/SL	4 - 7	4 - 7
38	164	DDF		60	104	HP/UB/SL	4 - 7	72 - 126
39	2	P			2	HP/UB/SL	3 - 5	6 - 10
40	6	P	6			HP/UB/SL	6 - 10	984 - 1,640
41	2	DDF			2	HP/UB/SL	3 - 5	6 - 10
42	54	DDF/DFR	15		39	HP/UB/SL	3 - 5	18 - 30
43	14	DDF		6	8	HP/UB/SL	3 - 5	6 - 10
44	24	DDF/DFR			24	HP/UB/SL	4 - 7	216 - 378
45	2	DDF		2		HP/UB/SL	4 - 7	56 - 98
46	12	DDF/P	2	4	6	HP/UB/SL	4 - 7	132 - 231
47	7	DDF			7	HP/UB/SL	4 - 7	8 - 14
48	42	DDF/DFR/ P		4	36	HP/UB/SL	4 - 7	48 - 72
49	38	DDF/DFP			38	HP/UB/SL	4 - 7	28 - 49
50	3	DDF			3	HP/UB/SL	4 - 7	200 - 350
51	4	DDF			4	HP/UB/SL	4 - 7	104 - 182
52	13	DDF			13	HP/UB/SL	3 - 5	9 - 15
53	20	DFP/P		18	2	HP/UB/SL	3 - 5	12 - 20
54	19	DDF			19	HP/UB/SL	4 - 7	52 - 91

Unit	Unit Acres	Silivi Method 1/	Yarding System			Fuels Mgt 2/	Volume Cut / Acre (range)(mbf)	Volume Cut / Unit (range)(mbf)
			Crawler	Cable	Aerial			
55	115	DDF/DFP/ DFR			115	HP/UB/SL	6 - 10	120 - 200
56	29	P			29	HP/UB/SL	3 - 5	345 - 575
57	1	DDF			1	HP/UB/SL	3 - 5	87 - 145
58	23	P		5	18	HP/UB/SL	3 - 5	3 - 5
59	3	DDF		2	1	HP/UB/SL	4 - 7	92 - 161
60	13	DDF/DFP			13	HP/UB/SL	4 - 7	12 - 21
61	11	DDF			11	HP/UB/SL	3 - 5	66 - 110
62	35	DDF/DFP/ P	5	20	10	HP/UB/SL	3 - 5	33 - 55
63	48	DFP/P	5	36	7	HP/UB/SL	4 - 7	140 - 245
64	198	DDF/DFP/ P		70	128	HP/UB/SL	4 - 7	192 - 336
65	7	DDF		3	4	HP/UB/SL	3 - 5	594 - 990
66	7	DDF			7	HP/UB/SL	4 - 7	28 - 49
67	4	DDF			4	HP/UB/SL	4 - 7	28 - 49
68	20	DDF/DFP/ P		5	15	HP/UB/SL	4 - 7	16 - 28
69	5	P		5		HP/UB/SL	4 - 7	80 - 140
70	5	DFP		1	4	HP/UB/SL	4 - 7	20 - 35
71	13	DDF		13		HP/UB/SL	4 - 7	20 - 35
72	44	DDF/DFP/ P		36	8	HP/UB/SL	4 - 7	52 - 91
73	29	DDF/DFR/ P			29	HP/UB/SL	4 - 7	176 - 308
74	380	DDF/DFP/ DFR/P	18	312	50	HP/UB/SL	4 - 7	116 - 203
75	8	P			8	HP/UB/SL	4 - 7	1,520 - 2,660
76	16	DDF/P			16	HP/UB/SL	4 - 7	32 - 56
77	5	DDF			5	HP/UB/SL	3 - 5	63 - 105
78	18	DDF			18	HP/UB/SL	3 - 5	15 - 25
79	15	DDF			15	HP/UB/SL	3 - 5	54 - 90

Unit	Unit Acres	Silivi Method 1/	Yarding System			Fuels Mgt 2/	Volume Cut / Acre (range)(mbf)	Volume Cut / Unit (range)(mbf)
			Crawler	Cable	Aerial			
80	6	DDF			6	HP/UB/SL	3 - 5	45 - 75
81	5	WDF		4	1	HP/UB/SL	3 - 5	18 - 30
82	3	WDF		3		HP/UB/SL	4 - 7	20 - 35
83	3	WDF		1	2	HP/UB/SL	4 - 7	12 - 21
84	34	DDF		32	2	HP/UB/SL	3 - 5	15 - 25
85	2	P			2	HP/UB/SL	3 - 5	573 - 955
86	18	DFP	6		12			
87	5	DFP	5					
88	179	DDF/DFP	70	70	39			

All volume numbers are estimates only and subject to change. Field operations during project implementation will mark individual units and trees and recalculate true volume.

1/ Silvilculture Methods: DDF = Dry Douglas Fir; WDF = Wet Douglas Fir; P = Pine
DFR = Douglas Fir Regen; DFP = Douglas Fir Poles

2/ Fuels Management:HP = Handpile, cover, and burn; UB = Underburn; SL = Slash

Total Acres / Harvest Method

	Crawler	**Cable**	**Aerial**
Acres 2,588	175	841	1,572
	7 %	33 %	60 %

BOBAR
TABLE 1
Proposed Action

November 19, 2002 — No New Road Construction

Unit	Unit Acres	Silivi Method 1/	Yarding System			Fuels Mgt 2/	Volume Cut / Acre (range)(mbf)	Volume Cut / Unit (range)(mbf)
			Crawler	Cable	Aerial			
1	21	P			21	HP/UB/SL	3 - 5	60 - 100
2	12	P			12	HP/UB/SL	3 - 5	36 - 60
3	14	P			14	HP/UB/SL	3 - 5	40 - 70
4	18	P			18	HP/UB/SL	3 - 5	50 - 90
5	4	P			4	HP/UB/SL	3 - 5	12 - 20
6	9	P			9	HP/UB/SL	3 - 5	27 - 45
7	27	P			27	HP/UB/SL	3 - 5	80 - 135
8	6	DDF			6	HP/UB/SL	3 - 5	18 - 30
9	19	P	8		11	HP/UB/SL	3 - 5	57 - 95
10	12	P	10		2	HP/UB/SL	3 - 5	36 - 60
11	115	DDF			115	HP/UB/SL	4 - 7	8 - 14
12	37	DFP/DDF			37	HP/UB/SL	6 - 10	186 - 310
13	11	DFP/DDF			11	HP/UB/SL	6 - 10	1,038 - 1,730
14	14	DDF			14	HP/UB/SL	3 - 5	6 - 10
15	12	DDF			12	HP/UB/SL	3 - 5	9 - 15
16	10	P			10	HP/UB/SL	6 - 10	264 - 440
17	11	DDF			11	HP/UB/SL	4 - 7	48 - 72
18	20	P/DDF			20	HP/UB/SL	3 - 5	30 - 50
19	39	DFP/DDF/ P			39	HP/UB/SL	6 - 10	66 - 110
20	41	DDF			41	HP/UB/SL	6 - 10	120 - 200
21	6	DDF			6	HP/UB/SL	4 - 7	156 - 273
22	18	DDF			18	HP/UB/SL	6 - 10	246 - 410
23	20	DDF			20	HP/UB/SL	3 - 5	18 - 30
24	11	DDF		8	3	HP/UB/SL	3 - 5	54 - 90
25	1	DDF			1	HP/UB/SL	4 - 7	80 - 140

Unit	Unit Acres	Silivi Method 1/	Yarding System			Fuels Mgt 2/	Volume Cut / Acre (range)(mbf)	Volume Cut / Unit (range)(mbf)
			Crawler	Cable	Aerial			
26	18	DDP			18	HP/UB/SL	4 - 7	44 - 77
27	2	DDF			2	HP/UB/SL	4 - 7	4 - 7
28	164	DDF/DFR		20	144	HP/UB/SL	4 - 7	72 - 126
29	2	P			2	HP/UB/SL	3 - 5	6 - 10
30	6	P	6			HP/UB/SL	6 - 10	984 - 1,640
31	2	DDF			2	HP/UB/SL	3 - 5	6 - 10
32	54	DDF/DFR	15		39	HP/UB/SL	3 - 5	18 - 30
33	14	DDF		6	8	HP/UB/SL	3 - 5	6 - 10
34	24	DDF/DFR			24	HP/UB/SL	4 - 7	216 - 378
35	2	DDF		2		HP/UB/SL	4 - 7	56 - 98
36	12	DDF/P	2	4	6	HP/UB/SL	4 - 7	132 - 231
37	7	DDF			7	HP/UB/SL	4 - 7	8 - 14
38	42	DDF		4	36	HP/UB/SL	4 - 7	48 - 72
39	38	DDF/DFP			38	HP/UB/SL	4 - 7	28 - 49
40	3	DDF			3	HP/UB/SL	4 - 7	200 - 350
41	4	DDF			4	HP/UB/SL	4 - 7	104 - 182
42	13	DDF			13	HP/UB/SL	3 - 5	9 - 15
43	20	DFP/P			20	HP/UB/SL	3 - 5	12 - 20
44	19	DDF			19	HP/UB/SL	4 - 7	52 - 91
45	115	DDF/DFP/ DFR			115	HP/UB/SL	6 - 10	120 - 200
46	29	P			29	HP/UB/SL	3 - 5	345 - 575
47	1	DDF			1	HP/UB/SL	3 - 5	87 - 145
48	23	P		5	18	HP/UB/SL	3 - 5	3 - 5
49	3	DDF		2	1	HP/UB/SL	4 - 7	92 - 161
50	13	DDF/DFP			13	HP/UB/SL	4 - 7	12 - 21
51	11	DDF			11	HP/UB/SL	3 - 5	66 - 110

Unit	Unit Acres	Silivi Method 1/	Yarding System			Fuels Mgt 2/	Volume Cut / Acre (range)(mbf)	Volume Cut / Unit (range)(mbf)
			Crawler	Cable	Aerial			
52	35	DDF/DFP/P	5	20	10	HP/UB/SL	3 - 5	33 - 55
53	48	DFP/P	5	36	7	HP/UB/SL	4 - 7	140 - 245
54	198	DDF/DFP/P		20	178	HP/UB/SL	4 - 7	192 - 336
55	7	DDF		3	4	HP/UB/SL	3 - 5	594 - 990
56	7	DDF			7	HP/UB/SL	4 - 7	28 - 49
57	4	DDF			4	HP/UB/SL	4 - 7	28 - 49
58	20	DDF/DFP/P		5	15	HP/UB/SL	4 - 7	16 - 28
59	5	P		5		HP/UB/SL	4 - 7	80 - 140
60	5	DFP		1	4	HP/UB/SL	4 - 7	20 - 35
61	13	DDF		13		HP/UB/SL	4 - 7	20 - 35
62	44	DDF/DFP/P		36	8	HP/UB/SL	4 - 7	52 - 91
63	29	DDF/DFR/P			29	HP/UB/SL	4 - 7	176 - 308
64	380	DDF/DFP/DFR/P	3	20	357	HP/UB/SL	4 - 7	116 - 203
65	8	P			8	HP/UB/SL	4 - 7	1,520 - 2,660
66	16	DDF/P			16	HP/UB/SL	4 - 7	32 - 56
67	5	DDF			5	HP/UB/SL	3 - 5	63 - 105
68	18	DDF			18	HP/UB/SL	3 - 5	15 - 25
69	15	DDF			15	HP/UB/SL	3 - 5	54 - 90
70	6	DDF			6	HP/UB/SL	3 - 5	45 - 75
71	5	WDF		4	1	HP/UB/SL	3 - 5	18 - 30
72	3	WDF		3		HP/UB/SL	4 - 7	20 - 35
73	3	WDF		1	2	HP/UB/SL	4 - 7	12 - 21
84	34	DDF		32	2	HP/UB/SL	3 - 5	15 - 25
85	2	P			2	HP/UB/SL	3 - 5	573 - 955
86	18	DFP	6		12	HP/UB/SL	3 - 5	54 - 90

Unit	Unit Acres	Silivi Method 1/	Yarding System			Fuels Mgt 2/	Volume Cut / Acre (range)(mbf)	Volume Cut / Unit (range)(mbf)
			Crawler	Cable	Aerial			
88	179	DDF/DFP	70	70	39	HP/UB/SL	3 - 5	537 - 895

All volume numbers are estimates only and subject to change. Field operations during project implementation will mark individual units and trees and recalculate true volume.

1/ Silvilculture Methods: DDF = Dry Douglas Fir; WDF = Wet Douglas Fir; P = Pine
DFR = Douglas Fir Regen; DFP = Douglas Fir Poles

2/ Fuels Management:HP = Handpile, cover, and burn; UB = Underburn; SL = Slash

Total Acres / Harvest Method

	Crawler	**Cable**	**Aerial**
Acres 2,259	135	320	1,804
	6 %	14 %	80 %

Bobar Landscape Project
Appendix B

SILVICULTURAL PRESCRIPTION
BOBAR PROJECT TIMBER SALE
(FY - 2003)

SILVICULTURAL PRESCRIPTION
BOBAR PROJECT TIMBER SALE (FY- 2003)

TABLE OF CONTENTS

2

FIGURES AND TABLES

Silvicultural Prescription
Bobar Project Timber Sale
(FY- 2003)

I. Management Direction and Objectives

The prescribed vegetation treatments in this document are designed to comply with both the Medford District Approved Resource Management Plan (RMP) (USDOI, 1994) and the Record of Decision (ROD) within the Final Supplemental Environmental Impact Statement (FEIS - the President's "Forest Plan for a Sustainable Economy and Environment") on Management of Habitat of Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (USDA, 1994a). This prescription also complies with the April 1994 interagency Record of Decision of the Northern Spotted Owl (ROD)(USDA, 1994), the Western Oregon Program-Management of Competing Vegetation Record of Decision (ROD)(USDOI, 1989), the Applegate Star/Boaz Watershed Analysis (USDOI, 1998), and the Little Applegate Watershed Analysis (USDA, 1995).

The Ashland Resource Area ID team and area manager developed and considered certain objectives for this silvicultural prescription. The objectives are as follows:

A. Reduce the density of all vegetation condition classes across the landscape to improve vegetation vigor and reduce the fire hazard while creating desired vegetation structural characteristics.

B. Maintain and restore natural functions and processes necessary for the stability of ecosystem health and productivity.

C. For the commercial forest stands, create stands with trees of varying size and age (diverse stand structure), and with various seral patterns across the landscape to promote mature/old-growth stand characteristics.

D. Manage mature/old-growth timber stands to maintain their existence, structure, and function.

E. Increase the species composition of pine species and incense cedar into forest stands where appropriate (these species are more fire and drought tolerant than Douglas-fir or true fir).

F. Create a favorable microenvironment for the natural establishment of seedlings (especially pine species and incense cedar) by providing adequate available growing space and woody material of various size classes.

G. Reduce timber stand basal area to increase individual tree vigor, growth, and quality.

H. Minimize impacts to the northern spotted owl and other sensitive species and

their habitat.

I. Maintain stream condition and stability in effected watersheds by maintaining appropriate stream buffers, by leaving trees in nonbuffered draw bottoms, and by avoiding slumps or slide areas.

J. Maintain the stability and productivity of the soils in the sale area.

K. Maintain the integrity and functions of oak woodlands and shrublands and increase early seral stages of vegetation within.

L. Minimize the negative affects of vegetation competing with conifer establishment and growth.

II. Site/Stand Description

A. General Description of the Site

1. Legal Description

The Bobar landscape design project is in the Applegate Adaptive Management Area (AMA), and is approximately 3 miles directly south of the town of Ruch, OR. The project area is located east of Upper Applegate Road, west of Yale Creek Road, south of Spencer Gulch, and north of USFS Road 20. The project area is comprised of 5 full and 25 partial sections within Townships 39 South, Ranges 2 and 3 West, and Township 40 South, Range 2 West of the Willamette Meridian.

2. Drainage/Watershed

Within the project area there are four major drainage areas (Beaver Creek, Waters Gulch, Yale Creek, and Grouse Creek) and several frontal drainage areas on the Applegate and Little Applegate Rivers. The Little Applegate River dissects the project area and the Applegate River is the western boundary.

B. Abiotic Conditions

1. Geomorphology/Soil Type

Tree height growth and the quantity of wood grown on any site is determined by the soil characteristics and properties. The characteristics and properties of soils are determined by physical and chemical processes that result from the interaction of five factors: climate, plants and animals, parent material, topography, and time. Parent material, climate, and topography account for most of the differences among soils in our area.

The project area is on the northern flank of the Klammath Mountain Province. This area's geologic history dates back approximately 150 million years. About fourteen million years ago, the area around the Applegate River began uplifting, centering under Condrey Mountain. The area uplifted an estimated 23,000 feet (USDA and USDI, 1998). Since this time, the mountaintops have eroded away, depositing sediment and creating the broad, relativity flat valley bottoms seen in the lower sections of the Applegate River. The uplifting is continuing today, although at a much slower rate. Numerous rock types exist in the area including limestone, marble, granite, mica, schist, and serpentine. During past climate changes,

the Klammath Province provided a geologic "bridge" that still functions today for plants and animals migrating in all directions. The Klammath River provides a "corridor" originating in the Great Basin and flowing west to the Pacific Ocean through the province (Atzet,1995).

Widespread great soil groups in this province include Haploxeralfs, Haploxerolls, and Xerochrepts.

The slopes have long concave profiles with steep ridge lines and moderate toeslopes. The soils grade from shallow, skeletal soils near the Ridgetops to deeper, finer textured on the lower slopes. This landscape is highly dissected but is notable for the lack of perennial streams. The mid to upper reaches of the south slopes tend to be nonforested due to the shallow soils, low rainfall and high evaporation rates. By contrast the northern slopes are cooler and are favorable for conifer growth.

The most common upland soil series in the project area include Vannoy, Voorhies, Caris, Offenbacher, Tallowbox, McMullin and Tallowbox. The Caris (Typic Xerochrepts - soils formed in a dry climate with thin or light colored surface horizons and little organic matter)/ Offenbacher series is widespread and commonly occurs on steep to very steep slopes (50 to 80%). Both soils are well drained colluvium. Typically the soils range from 20 to 40 inches in depth and overlay fractured metamorphised volcanic bedrock. Caris contains a dark brown gravelly loam over dark, very gravelly clay loam subsoil. Offenbacher has a grayish brown gravelly loam over reddish brown loam subsoil. Both soils are stable and permeable (.6 to 2.0 inches/hour). The available water capacity ranges from .03 to .19 inches/inch of soil and the site index ranges from 65 to 75 depending upon the aspect (Douglas-fir 50-year base).

Vannoy (Mollic Haploxeralfs - thick, dark colored, high base saturation, and strong structure, formed in a warm and continuously dry summer for long periods, moist in winter but with a minimum horizon), another widespread series, developed on moderate to steep slopes from metamorphic material. It is well drained and ranges from 20 to 40 inches in depth. Vannoy has a dark brown silt loam surface over yellowish red clay loam subsoil. Permeability is only moderate due to the dense subsoil (B horizon; .2 to .6 inches/hour). Surface protection is warranted due to the slow infiltration rate. The available water capacity ranges from .12 to .20 inches/inch of soil and the Douglas-fir site index ranges from 75 to 80 depending upon the aspect (50-year base).

The Voorhies series has a dark brown gravelly loam over brown gravelly clay loam subsoil. Permeability ranges from .6 to 2.0 inches/hour. The available water capacity ranges from .07 to .12 inches/inch of soil and the Douglas-fir site index ranges from 65 to 75 (50-year base).

The Tallowbox series is a moderately deep, somewhat excessively drained soil found on hillslopes and ridges. It formed in colluvium derived from granitic rock. The slope ranges from 30 to 80%. The surface layer is dark brown gravelly sandy loam about 6 inches thick. The upper 6 inches of the subsoil is dark brown sandy loam. The lower 11 inches is brown gravelly sandy loam. Weathered bedrock is at a depth of 23 inches. Permeability is moderately rapid and ranges from 2.0 to 6.0 inches/hour. Available water capacity is about .07 to .1 inches/inch of soil. The site index for Douglas-fir ranges from 70 to 90 (50-year base).

The McMullin-Rock outcrop complex is shallow, well drained, and formed in colluvium derived from igneous and metamorphic rock. The A horizon is approximately 7 inches thick and depth to bedrock ranges from 12 to 20 inches. Permeability ranges from .6 to 2 inches/hour. The available water capacity ranges from .10 to .15 inches/inch of soil.

2. Topography/Elevation/Aspect

Elevations range from 1,400 feet near the Little Applegate River to 3,900 feet above sea level near Cinnabar Mountain. The major ridges are oriented in a north to south direction and most forest stands have a west or east aspect.

3. Precipitation/Snowfall/Temperature Extremes

The Applegate Valley is one of the driest areas west of the Cascade Mountains. Average annual precipitation in the Bobar project area ranges from approximately 22 inches along the Little Applegate (elevation 1,466 feet) to over 36 inches in the highest elevations. Precipitation usually occurs in the form of rainfall over most of the area, although a mixture of rain and snow occurs between 3,500 and 3,900 feet. The majority of precipitation falls during November through March (68 percent of the yearly total). The annual precipitation fluctuates widely from year-to-year in the Applegate Valley. The 30-year average (normal) annual precipitation at Buncom is 22.8 inches (NOAA 1994). Below normal precipitation occurred during 6 of the past 10 years (through water year 1996), and during the 2000/2001 water year.

Summer months are predominately hot and dry with maximum daytime temperatures averaging 89 degrees Fahrenheit during July and August. During the winter, daytime temperatures average 51 degrees Fahrenheit during January. Minimum nighttime temperatures at Ruch average 49 degrees Fahrenheit in August and 31 degrees Fahrenheit in January. Summer temperatures normally are accompanied by low humidity, typical of a Mediterranean-type climate.

Prevailing winds during the summer are from the north or northwest and are usually light. Summer thunderstorms can have winds in excess of 50 mph from any direction, but most of the storms enter the area from the south or southwest.

C. Biotic Conditions

1. Tree Series/Plant Associations

There are three tree series in the Bobar project area: Douglas-fir, ponderosa pine, and white oak. Plant association descriptions within these series can be found in Preliminary Plant Associations of the Siskiyou Mountain Province (Atzet and Wheeler, 1984) and Field Guide to the Forested Plant Associations of Southwestern Oregon (Atzet et.al., 1996; see Table 1).

The PSME(Douglas-fir)/RHDI(poison oak) and PSME/RHDI-BEPI (Piper's Oregongrape) plant associations are most prevalent at lower elevations and on dry ridges. As the elevation increases and rainfall is more abundant, or the aspect is more conducive to cooler temperatures, plant associations most often found include PSME-PIPO (ponderosa pine), and PSME/BENE (dwarf Oregongrape).

Table 1. Tree Series/Plant Associations Common to the Bobar Project Area.

Douglas-fir Series/Plant Associations	Ponderosa Pine Series/Plant Associations	White Oak Series/Plant Associations
PSME (Douglas-fir)/BENE (dwarf Oregon grape)	PIPO (Ponderosa pine)-PSME (Douglas-fir)	QUGA (Oregon white oak)/CYEC (Hedgehog dogtail)
PSME/RHDI (Poison oak)-BEPI (Piper's Oregongrape)	PIPO-QUKE (California black oak)	QUGA-PSME/RHDI
PSME/RHDI		QUGA-CEMO (Birchleaf Mountain Mahogany)
PSME/Depauperate		
PSME-PIPO (Ponderosa pine)		

2. Stand History

Fire profoundly influenced upland systems and was used extensively by Native Americans and Euroamerican settlers until fire suppression began in the early 1900's. The lack of frequent, low-intensity fire in recent history has changed the landscape. Stands of widely spaced large diameter trees such as ponderosa pine and Douglas-fir were common in the lower elevations. Grass or light underbrush was often found under the large trees. Records from the General Land Office surveys in the late 1800's describe the lower elevation slopes generally as “open ridges” or “rolling, open timber with an undergrowth manzanita and chaparral”(Lalande,1995). Notes indicate that mid to upper elevations consisted of mature “old-growth” pine and fir stands, remnant oak and cedar openings, brush fields and numerous patches of young seedlings.

After pioneer settlement, the density of endemic tree and shrub species was reduced as a result of anthropogenic disturbances (lighting fires, human caused fires for land clearing, hunting, mining, grazing, protection and food, mining, logging, and other factors related to urbanization).
Due to the frequent disturbance regime, historic forest lands were generally more open, had fewer trees per acres, trees of larger diameter, and a different species composition. These stands generally had more large diameter ponderosa pine, oak species, incense cedar and native grasses. In the moist micro sites where Douglas-fir is better adapted, it probably never reached the climax stage because of the frequent disturbance regime. Disturbances were probably as frequently as every 1 to 25 years. In this project area, many of the commercial stands originated between 1864 and 1917. Most of the forest stands became established within 10 years after a fire, although the harsher sites may have taken 30 to 40 years to become forested. The oldest trees found were 350 and 372 years-old.

3. Structure Description

The next level of dichotomy from tree series/plant associations is vegetation condition class. The Medford District Watershed Analysis Committee (1994) has designated the following classes: Grass, Forbs, Herbaceous; Shrubs, Non-forest Land; Hardwood/Woodland; Early (0 to 5 years) and Seedlings/Saplings (0 to 4.9 inches DBH); Poles (5 to 11 inches DBH); Mid (11 to 21 inches DBH); and Mature/Old-growth (21 inches + DBH). The following is a description of the stand development and structure of each vegetation condition class:

a. Grass, Forbs, Herbaceous

During the nineteenth century the area of open grassland was also more extensive because of frequent disturbance. Since that time the ecological processes of relay and initial floristics have occurred and areas that may have been grasslands have given way to shrubs and tree species. There are 520 acres of grassland in the project area. The grasslands in the project area are limited to areas with severe environmental conditions such as south to west aspects with shallow, rocky soils. Mixtures of grasses, shrubs, and multi-layered tree stands can occur here. Common grasses include California fescue, blue wildrye, and hedgehog dogtail.

Common herbs in moist areas include western starflower, woods strawberry, Oregon fairybell, pathfinder, catchweed bedstraw, rattlesnake plantain, white vein pyrola, miner's lettuce, columbine, trillium, starry false solomon's seal, and bleeding heart. In the dry Douglas-fir and pine sites, hairy honeysuckle, lupine, Pacific hound's tongue, thicket milk-vetch, white-flowered hawkweed, woodland tarweed, mountain sweet root, purple sweet root, bracken fern, common yarrow, and hedge parsley are the common herbs.

b. Shrubs/Non-forest Land

The shrublands have been influenced by a lack of fire disturbance. As a result, extremely dense stands of shrubs and tree species are common. Most of the shrublands are heterogeneous in species composition, arrangement of species, and structure. The vegetation tends to be late seral with a lack of early seral stages. There are approximately 708 acres of shrubland in the project area.

Whiteleaf manzanita is the most abundant species and is tree-like in form. Scattered throughout the manzanita patches are clumps of wedgeleaf ceanothus, deerbrush ceanothus, poison oak, mountain mahogany, hardwood trees, and various size classes of conifer species. Conifer tree species migrate into the shrublands during wet climatic cycles but retreat when harsh climatic conditions occur. Five layers of vegetation are possible. Other dry land shrubs include Piper's Oregongrape and silk tassel. Moist microenvironment shrubs, most frequently found on northerly aspects, include snowberry, California hazel, creambrush oceanspray, dwarf Oregongrape, serviceberry, Indian plum, thimbleberry, black raspberry, trailing blackberry, ribes species, vine maple, and Pacific yew.

c. Hardwood/Woodland

Oak woodlands are the lower elevation limit for forest vegetation and are transitional to savanna and grasslands. Oregon white oak occupies sites where available soil moisture is between that supporting grass or ponderosa pine and the greater amount required to support Douglas-fir. The floristic composition and structure of the woodlands have also been disturbed by fire suppression, livestock grazing, the introduction of exotic species, and firewood harvest. Common plant associations include QUGA-CYEC (hedgehog dogtail), QUGA-CEMO (Birchleaf mountain mahogany), and QUGA-PSME/RHDI. Other plant species common to the associations include Pacific madrone, California black oak, ponderosa pine, whiteleaf manzanita, wedgeleaf and deerbrush ceanothus, poison oak, snowberry, hairy honeysuckle, woodland strawberry, wild carrot, and *Torilis arvensis.*

The oak woodlands commonly have 3 to 4 layers of vegetation; the mature oaks, dominate ponderosa pine or Douglas-fir, grass, and the fourth layer sometimes being conifer or oak regeneration. When shrubs are present, the stands can have 5 or more layers of vegetation. It is common for whiteleaf manzanita to be tree-like in form. There are 2,347 acres of woodland in the project area.

d. Early (0 to 5 years) and Seedlings/Saplings (0 to 4.9 inches DBH)

These two condition classes are grouped together because both classes are usually tree plantations established after logging. The predominant species in the plantations are Douglas-fir or ponderosa pine. Douglas-fir is planted on cool, moist sites with northwest to northeast aspects. Ponderosa pine and incense cedar are planted on low elevation sites and on areas with hot, dry aspects (northwest, west, southwest, south, and southeast aspects). Many plantations are a mixture of species including hardwoods, with Pacific madrone being the most abundant. If residual conifer trees from the previous stand were left standing, as many as 4 layers of vegetation can exist: newly planted seedlings, hardwood sprouts overtopping the planted seedlings, residual saplings to poles, and residual overstory trees. Most often just two layers are present, the seedlings and overtopping hardwoods. This is the time period after a disturbance in which new individual plants and species continue to appear. There are 328 acres of plantations in the project area and these plantations are in the stand initiation stage of development. This represents only 4 percent of the project area; 6 percent of the forestland base.

e. Poles (5 to 11 inches DBH)

There are 597 acres of pole size trees in the project area and most of these stands are under 100 years of age. Many of the trees are suppressed and diameter growth is less than 1 inch per decade. These stands originated after fires or logging activity. Some pole sized trees may be found on ridge tops or on poor sites and are over 100 years of age. There is a wide range of stand densities and there may be stands with over 1,000 trees per acre. In some stands, crown ratios (length of tree crown divided by total tree height) are less than 30% and released trees would probably not respond to thinning. Trees of the smallest diameter classes have stem diameters less than one percent of the total tree height (tall and skinny appearance) subjecting these trees to snow, ice, and wind damage. Healthy pole stands will often be found on northerly aspects, are in the stem exclusion stage (the time period when new plants do not appear and some of the existing ones die) and are predominantly single layered. Sometimes older residual overstory trees are scattered throughout the pole stands and no understory vegetation is usually present except for scattered forbs.

f. Mid (11 to 21 inches DBH)

The majority of the commercial timber stands in the project area are in the mid-condition class (3,322 acres). Douglas-fir and ponderosa pine dominate the stands, with small amounts of sugar pine and incense cedar in the overstory. Canyon live oak, Pacific madrone, and California black oak are often found in the understory. These stands became established over a 10 to 40 year period following a disturbance and most of the stands are now between 80 and 170 years of age. Many of these stands are beginning to enter the understory reinitiation stage (later when a disturbance creates an opening in the forest canopy layer, forest floor herbs, shrubs, and trees again appear and survive in the understory). As mortality from wind damage, bark beetles, and pathogens create small openings in the crown canopy of the trees, regeneration begins to occur in the cleared area below. Although single story stands do exist, two to three canopy layers are present in most of the stands and four layers are present when old-growth trees are found in the overstory. Commonly found in these stands are suppressed and intermediate crown class conifers, suppressed hardwood trees, dominant and codominant crown class conifers, and old-growth trees. Douglas-fir that invaded the dry pine sites are experiencing moisture stress and are also being killed by Douglas-fir bark beetle. Pine series stands have experienced high levels of tree mortality due to stress caused by the competition from Douglas-fir trees and subsequent attacks by the western pine beetle.

g. Mature/Old-growth (21 inches + DBH)

In the project area, small timber stands in this condition class are usually found in cool, moist microenvironments or higher elevations. The oldest trees are found along streams and in topographic areas with favorable north to east aspects where protected from fire. According to stand inventory data, there are 1,011 acres of large sawlogs stands (21 inches DBH+) in the sale area. Most of these stands are in the mature seral stage with multiple canopy layers. Dominant crown class trees 372 years of age and younger, large diameter and large diameter limbed trees are present with a variety of other age class trees beneath (vertical structure, multi-cohort stand). A minimum of 4 canopy layers are present.

The ROD and RMP define the mature seral stage as the point when stand growth slows to the time when the forest develops structural diversity; approximately age 80 to 200. Old-growth is defined as the stage which constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. This stage exists from approximately age 200 until stand replacement occurs and secondary succession begins again (understory reinitiation stage of forest development). For purposes of inventory, old-growth stands on BLM-administered lands are identified if they are at least 10% stocked with trees of 200 years or older and are 10 acres or more in size. For purposes of habitat or biological diversity, the BLM uses the appropriate minimum and average definitions as provided by PNW publications 447 (USDA, 1986) and GTR-285 (Franklin, 1981). GTR-285 states that the size of old-growth units should be at least 300 acres in size to function as old-growth forests, and that the working definition emphasizes structural and compositional characteristics rather than the conceptually important functional features that are difficult to measure (Objective D, page 4).

The landscape pattern of the project area can be considered "coarse-grained" because of the varying stand structure and species composition. This is a result of natural disturbances, timber harvesting and a highly dissected topography that creates diverse site conditions. However, at the stand level, the landscape pattern can be considered more fine-grained when compared to historic stands for all vegetation condition classes.

Subtle changes in species composition and stand structure are occurring over the landscape. Many trees

with old-growth characteristics are dying as a result of increased competition with second growth trees for limited resources . Mortality is also occurring in mid to mature vegetation classes due to Douglas-fir dwarf mistletoe infection. Douglas-fir, the climax species for the majority of the forested area, is replacing ponderosa pine, sugar pine and incense cedar because of its more shade-tolerant nature. In some areas white fir is migrating to lower elevations and encroaching upon the Douglas-fir tree series. Douglas-fir is also encroaching upon the edges of the oak woodlands, although mortality of Douglas-fir along these edges has been noticeable during the last few years. Whiteleaf manzanita and ceanothus species are migrating into the oak woodlands and replacing the oaks, pines, and native grass species. In the mid-size vegetation condition class, suppressed shrubs and hardwood trees beneath the dominant tree canopy layer are dying. Pacific madrone and white and black oak have dropped out of conifer stands where light and water have become limiting. Dead whiteleaf manzanita may be found in the understory of some conifer stands and is indicative of a vegetation shift from shrubs to trees. This trend also indicates that whiteleaf manzanita is probably the species that will pioneer the site following future disturbance. Other shrub species dying out of the conifer stands include deerbrush and wedgeleaf ceanothus, creambrush oceanspray, and serviceberry.

It must be recognized that we are observing the landscape vegetation of today at one single point in time. Although current vegetation stem densities are high and are mostly in the mid and late seral stages, the vegetation condition classes of today are atypical when compared to historic vegetation. This is due primarily to the effects of fire suppression on the landscape. It must also be recognized that with or without silvicultural management, the vegetation will be changing continuously because of natural succession. There is no single state of a forest that is the only natural state. The recommended prescriptions in this document will be cultivating late-successional characteristics such as variable stand structure and more vigorous growth within the stands. Ten to forty years from now most of the mature stands will be composed of trees larger than 20 inches DBH, although even-aged, mid size stands without residual old-growth trees may still require an additional 100 years to develop mature/old-growth characteristics.

4. Coarse Woody Material

The overall average amount of coarse woody material is 12.4 tons per acre. The coarse woody material (CWM) stem diameters were concentrated in the 9 to 34 inch classes at the large end and averaged 17.4 feet in length. Coarse woody material was most often found to be in decomposition class 3 which is characterized by very little bark, no twigs, but a solid stem.

D. Insects, Disease, Forest Health

Bark beetle infestations are occurring in the project area. Western pine beetles (*Dendroctonus brevicomis*) are attacking the pines while flatheaded fir borers (*Melanophila drummondi*) and Douglas-fir beetles (*Dendroctonus pseudotsugae*) are killing Douglas-fir. Drought conditions and high stocking levels are severely stressing the trees physiologically, enabling the beetles to enter and kill the trees. The average tree vigor rating as measured by leaf area index is 43. Trees with vigor ratings below 30 will succumb to attack from bark beetles of relatively low intensity. Trees with vigor between 30-70 can withstand progressively higher attacks but are still in danger of mortality from the insect attacks. Trees with a vigor rating of between 70-100 can generally survive one or more years of relatively heavy attacks and trees with ratings above 100 cannot be killed by bark beetles.

Douglas-fir dwarf mistletoe (*Arceuthobium douglasii*) is present in parts of the project area. The most

heavily infected trees are found in the mature and mid vegetation classes but the smaller diameter classes are also becoming infected. Infections are usually systemic and form massive globose brooms. Heavy infections result in growth loss, wood quality reduction, top-killing and mortality. Although the spread of the infection is slow, as the trees lose vigor from the mistletoe infection the susceptibility to attack from insects and pathogens increases.

Forest pathogens are also changing the forest stand structure and forest development pattern. Phellinus pini (red ring rot) is affecting Douglas-fir and ponderosa pine. It is apparent that the disease is most common in stressed trees. Some of the infected trees are beginning to die or are subject to stem breakage thus allowing light to reach the forest floor and the understory reinitiation stage to begin. Brown cubical butt rot (Phaelous schweinitzii) is also present.

Trees in the project area are growing at the lowest levels since stand establishment in the 1800s. Ten year radial growth is approximately .4 inches, considerably less than 1 inch of diameter growth every 10 years (Fig. 1). Entomologists have found that at least 1.5 inches of tree diameter growth per decade decreases the risk of bark beetle attack. Stand vigor is decreasing because timber stands are significantly overstocked. Relative density index ratings indicate that stands are at the point of imminent mortality and suppression (RDI of .55; crown closure occurs at a RDI of .15). Relative density index is the ratio of actual stand density to the maximum stand density attainable in a stand with the same mean tree volume. Many stands in the project area have a relative density of over .70, so in regard to stand growth and vigor the forest is not healthy. It should also be pointed out that even if some of the stands are thinned in the near future, mortality of trees may continue because of the loss of tree sapwood (cavitation). Decreases in tree vigor and growth have contributed to an overall decline in forest health. Some of the treated timber stands may only experience improved tree vigor with increased precipitation and time.

Forest health is quantified by assessing the physical environment itself, the forest's resistance to catastrophic change, tree mortality, changes in tree growth and vigor, changes in species composition, erosion, water drainage, stream flow, and nutrient cycling. According to the Applegate Adaptive Management Area Ecosystem Health Assessment (USDA, 1994c), the physical, biotic, and trophic networks (natural functions and processes) are intact and working in the Applegate Adaptive Management Area except where soil erosion or raveling occurs, where certain stream reaches are aggraded, or where high elevation clearcuts are still non-reforested. These eroded, aggraded, and non-reforested areas represent a small portion of the adaptive management area and none of these areas are known to be within the project area.

A healthy forest ecosystem has the physical environment, biotic resources, and trophic networks necessary to sustain processes and viable populations of indigenous species. When these criteria are met, the ecosystem is able to maintain its productivity and resilience over time when exposed to drought, wildfire, insect attack, or human-induced changes. The Bobar project area may not be resilient to catastrophic change. As mentioned earlier, vegetation densities are very high and ladder fuels are abundant. Vegetation mortality is already occurring because of dwarf mistletoe infection, plant competition and expanding bark beetle populations, so the stage is being set for catastrophic stand replacement fires. Stand species composition and structure shifts previously discussed in the vegetation class description sections could also be considered unhealthy. The replacement of ponderosa pine and sugar pine by Douglas-fir increases the percentage of drought-susceptible trees in a stand, therefore, the risk of beetle infestation and/or wildfire also increases.

E. Specific Stand Data

ORGANON (1992) was used to analyze data from 49 plots distributed throughout the project area. For individual stands, trees per acre ranged from 185 to 630; basal area per acre (BA/AC), 166 to 497 ft^2; and relative density index .597 to 1.366. Table 2 presents stand information for some of the Operations Inventory (OI) units sampled in the Bobar project area.

Currently, the stocking levels of stands throughout the project area are high. This is primarily due to the lack of large-scale natural disturbance and fire suppression. The overall average for the project area is 348 trees per acre. Average radial growth for the past ten years is .38 inches. The average relative density for the area is .82 and indicates that physiologically the trees are at the point of suppression and mortality.

F. Maps of Proposed Project
(See Attached Maps)

III. Analysis In Support of Prescription

A. Desired Future Condition

A "coarse grained" landscape pattern should be the broad goal of forest management. Over time a wide range of stand densities, stand structural characteristics, age classes, species composition, and arrangement of stand components should be developed to create stands with late-successional characteristics (this implies uneven-aged management). A variety of species in various seral stages of development is necessary to provide for a variety of habitats and perhaps ecosystem functions. The landscape must be managed so that connectivity of mature/old-growth stands is maintained where possible after considering anthropogenic influences. Ten to forty years from now most of the thinned stands will be composed of trees greater than 20 inches DBH. It must be reemphasized that the present day even-aged, single storied stands without residual mature/old-growth trees may still require an additional 100 years to develop the desired characteristics. These stands must be shifted from the stem exclusion stage, to the understory reinitiation stage, and finally to the old-growth stage.

Stand densities should not be allowed to reach the point of imminent mortality and suppression. This point is reached when the relative density index is .55 or greater. The relative density index of Douglas-fir stands should range between .35 and .55. Table 3 shows the recommended stocking levels necessary to lower stand relative densities to an acceptable level. Harvesting greater amounts of basal area per acre would result in the removal of more trees than necessary.

Stand densities should be lower on pine sites, uneven-aged understory reinitiation stands where variable relative density indexes are required, ridges, and droughty areas in order to maintain maximum health and stand resiliency. The Applegate Adaptive Management Area Ecosystem Health Assessment recommends 60 to 120 ft^2 BA/AC as an acceptable level of basal area in these areas. On these sites the relative density index may be below .35 because there is evidence that heavy thinning to a relative density index of .25 is necessary for the development of the understory and vertical diversity (Hayes et.al., 1997). In contrast, this is considered to be a heavy thinning in Douglas-fir stands and landscape designing should be used for locating the desired areas for heavily thinned stands.

Dense pole and mid-sized trees should be harvested from around the crowns of trees with old-growth characteristics to ensure their survival. Resulting stand densities should be lower than present levels though the stand densities will still be higher than historic levels as discussed in a previous section of the

prescription. The ROD and RMP directs that stands must not have fewer than 16 trees per acre. Biologically, good sites in the Applegate Valley can support approximately 20 healthy, 50-inch DBH trees per acre. At this stocking level there is likely to be a rich understory.

On harsh sites the species composition of stands should contain at least 25% ponderosa pine, which is a drought resistant species. This species exhibits characteristics that allow them to avoid and tolerate desiccation. Hydration of the protoplasm and stomatal closure characteristics effect the rate of photosynthesis. Stomatal closure occurs at higher water stress levels in ponderosa pine than in Douglas-fir, grand fir or sugar pine. As stomata close, resistance to CO_2 transfer increases and rates of photosynthesis decrease. Closure of the stomata allows trees to conserve water. Ponderosa pine can maintain higher levels of photosynthesis as foliar stress builds up to -12 atmospheres and then drops as stress increases. On these harsh sites, hardwood species, especially large diameter trees, should also be maintained in stands. In some conifer stands, where Pacific madrone is the predominant species in the understory, prescribed fire will be needed to control the sprouts. Variety in the arrangement of species is also important.

Diverse stand structure (horizontal and vertical) is also necessary to support a wide variety of species. Wildlife species respond to ecological characteristics of trees regardless of forest age. Future stands should be multi-cohort stands with as many vertical layers of vegetation as the endemic species permits. Trees should develop large crowns, large diameter limbs, and deep fissures in the bark. A variety of seral stages will also add to the diversity. The end result should be a healthy forest ecosystem that has the physical environment, biotic resources, and trophic networks capable of sustaining processes and viable populations of indigenous species. An ecosystem that, when exposed to drought, wildlife, insect attack, and human-induced changes, remains productive and resilient over time.

Table 2. Diameter Growth in Thinned vs. Unthinned Stands Grown For 20 Years

O.I.# POLES MID MATURE	STAND AGE (BREAST HEIGHT AGE)	PRESENT BA/AC (ft^2)	PRESENT TREES PER ACRE	PRESENT 10-YEAR INCREMENT (INCHES)	PRESENT AVG. DBH	PROJECTED DBH IN 20 YEARS (INCHES) UNTHINNED	PROJECTED DBH IN 20 YEARS (INCHES) THINNED
POLES							
150258	95	197	576	.33	7.9	9.4	12.2
150556	65	267	492	.42	10.0	11.5	20.4
150558	94	236	630	.46	8.3	10.5	16.9
MID							
150183	120	245	186	.35	15.5	17.1	19.8
150250	101	497	284	.58	17.9	19.4	18.6
150415	93	272	557	.26	9.5	10.9	14.4
150543	119	307	295	.45	13.8	15.7	22.2
150562	83	192	347	.40	10.1	11.9	15.3
MATURE							
150290	134	201	185	.28	14.1	16.5	21.4
150406	120	235	217	.36	14.1	19.1	23.4
150468	94	166	368	.38	9.1	10.5	17.0
150471	126	239	203	.38	14.7	16.6	21.9
150548	135	320	185	.35	17.8	19.4	24.7

Table 3. Recommended BA/AC (ft^2) In Order to Lower Stand Relative Density to an Acceptable Level.

O.I.#	PRESENT BA/AC (ft^2)	PRESENT RELATIVE DENSITY	RECOMMENDED BA/AC (ft^2)	RESULTING RELATIVE DENSITY
POLES				
150258	197	.746	103	.349
150556	267	.924	119	.349
150558	236	.879	116	.349
MID				
150183	245	.712	126	.349
150250	497	1.365	119	.349
150415	272	.960	110	.349
150543	307	.934	134	.349
150562	192	.661	111	.349
MATURE				
150290	201	.606	130	.349
150406	235	.710	136	.349
150468	166	.597	118	.349
150471	239	.711	132	.349
150548	320	.881	139	.349

B. Silvicultural Options Considered

The environmental assessment for the Bobar Project lists 3 Alternatives for the project:

Alternative I. No Action.

Alternative II. Treat the entire landscape with a variety of silvicultural prescriptions, leaving various numbers of trees per acre, in diverse structures, based on distinct tree series and plant association requirements. Treat the oak woodlands with an appropriate prescription.

Alternative III. Treat the entire landscape leaving 16 to 25 trees per acre. Treat oak woodlands with appropriate prescription.

C. Recommended Treatment or Action

In order to reduce the density of all vegetation over the landscape, reduce fuel loading, support ecosystem based

management, and create structurally diverse forest stands, Alternative II of the environmental assessment is recommended to be the proposed action. A combination of 2 silvicultural methods will be used to treat the landscape vegetation (low thinnings and selection methods).

All of the recommended prescriptions are designed to retain the largest tree DBH classes, restore the vigor of the forest lands, and keep silviculture options open for the future. The selection harvest treatments will help to promote vertical stand structure and encourage species diversity .

1. Commercial Thinning of the Mid and Mature/Old-growth Condition Classes

The majority of the commercial acreage to be treated would be commercially thinned. The areas to be thinned will have the highest stocking densities and will be located between the group selection and single tree selection areas. The treatment will be a combination of crown spacing and basal area thinning. Homogeneous Douglas-fir stands with constant amounts of basal area that fall within the range of 166 to 497 ft^2 per acre will be treated using basal area guidelines to reduce basal area to between 80 and 160 ft^2 per acre depending upon the site conditions. Dry sites may have the minimum amount and moist sites may have the maximum amount of basal area. Heterogeneous stands with a wide range of basal areas when trees tend to be clumped will be treated using crown spacing guidelines. Crown spacing will be used to release old-growth trees and desired early seral species.

Trees on moist Douglas-fir timber sites will be thinned to a 3 to 15-foot crown spacing. On dry Douglas-fir and pine sites, trees will be thinned to a 10 to 25-foot crown spacing. In areas where tree mortality is occurring because of bark beetles, stands will be thinned to a 15 to 35-foot crown spacing. Trees recommended for harvest include suppressed, intermediate, and some codominant crown class trees with live crown ratios of less than 30%, trees lacking branches on one or more sides of the bole that are not conical in shape, dying trees with pitch tubes, a portion of the dead trees with salvageable wood, and trees with broken or forked tops. Second growth trees will also be thinned from around trees with old-growth characteristics to assure the survival of the dominant, structurally unique, old-growth trees. Table 4 shows the benefits of commercial thinning in regard to the capture of future tree mortality and an increase in tree growth. Two OI units were chosen to represent the mid and mature vegetation classes and were modeled in ORGANON to provide the data for Table 4. The stands resulting from thinning more closely resemble historical stands in that they have larger and fewer trees per acre.

Table 4. Description of O.I. Units 150415 and 150548 With and Without Silvicultural Treatment.

Existing Stand: 150415 (Mid stand)

Stand Age	Trees/ Acre	Basal Area	Scribner Volume	10 Year Change in Volume
104	557	272	34,517	-------
Future Growth of Stand if Not Treated (note the decrease in trees/acre through natural mortality):				
114	470	267	37,495	2,978
124	408	266	40,273	2,778
134	360	266	43,628	3,355
144	322	268	46,201	2,573
154	290	271	49,178	2,977
Future Growth if Stand is Thinned to a Relative Density Index of .35 (110 ft^2 Basal Area/Acre):				
114	117	115	19,502	------
124	109	124	22,086	2,584
134	104	133	25,006	2,920
144	100	143	27,854	2,848
154	97	154	30,824	2,970

Existing Stand: 150548 (Mature stand)

Stand Age	Trees/ Acre	Basal Area	Scribner Volume	10 Year Change in Volume
145	185	320	85,989	------
Future Growth of Stand if Not Treated (note the decrease in trees/acre through natural mortality):				
155	174	329	90,887	4,898
165	165	337	95,622	4,735
175	156	346	99,973	4,351
185	149	354	104,055	4,082
195	142	361	107,972	3,917
Future Growth if Stand is Thinned to a Relative Density Index of .35 (153 ft^2 Basal Area/Acre):				
155	50	152	46,713	------
165	49	164	51,095	4,382
175	49	176	55,427	4,332
185	49	188	59,542	4,115
195	48	200	63,561	4,019

To further portray the prescriptions, the Stand Visualization System (SVS) was used to show what existing forest stands look like today and what they will look like after the proposed prescriptions are applied (U.S.D.A. and University of Washington, 1995). Organon plot data was input into the SVS program for the simulations. The following data is for

individual forest stands previously described in Table 4. Many similar stands of each vegetation type were studied to develop the prescriptions. **Even though the average prescription may state different figures, other individual stands will be marked approaching the simulation figures because of similar stand structure and existing trees per acre.**

Stand 150415z.001 is a mid-sized Douglas-fir stand that has dry site characteristics (T39S-R3W-26). Presently the stand has 557 trees per acre and a relative density index of .960. There are 293 trees per acre that are less than 8 inches DBH. Illustration 150415z.003 shows the stand after harvest (130 trees per acre at a RDI of .349). Illustration 150415z.004 shows the treated stand 20 years later (109 trees per acre, RDI of .37, with trees ranging in size from 6 to 40 inches DBH).

2. Group Selection Openings

On dry ponderosa pine or Douglas-fir sites, group selection areas up to 1-acre in size (236-foot diameter opening) will be harvested adjacent to suitable pine trees creating openings arranged in a random, natural pattern. Old-growth yellow bark pine can be centered in the group selection openings. These openings are needed to increase the stocking level of pine species (ponderosa pine needs 25% full sunlight to grow) and incense cedar. Eighty ft^2 BA/AC of timber will be left standing around the group selection areas to allow more light to enter the openings and to create spatial variability. In areas with a cool, moist microenvironment 1/7 to 1/6-acre group selection areas (88 to 96-foot diameter openings) around suitable Douglas-fir seed trees will be created to establish Douglas-fir seedlings.

3. Single Tree Selection Harvesting for the Purpose of Creating Vertical Stand Structure (Understory Reinitiation Stage/Variable Relative Density Index)

Eleven Douglas-fir stands 150-years of age or older have been selected for understory reinitiation stage selection harvest (150290, 150338, 150406, 150427, 150468, 150511, 150548, 150580, 150585, 150588, and 150603). These stands comprise approximately 8 percent of the forestland base, or 457 acres. The RMP discusses the objectives of this prescription and some trees with late-successional characteristics will have to be harvested to meet the objectives. These trees are most likely in the suppressed and intermediate crown classes and subject to bark beetle attack. Treatment is needed to release natural regeneration and to create multiple-canopied stands over time. Treatment within these stands will be variable as stand structure conditions are not homogeneous. After harvest the RDI will range from approximately .160 to .350. Three treatment situations are described in the marking guidelines depending upon the age class of trees found in the OI units.

SVS illustration 150548z.001 is a mature-sized Douglas-fir stand that has dry site characteristics (T39S-R3W-35). Presently the stand has 185 trees per acre and a relative density index of .881. Illustration 150548z.003 shows the stand after harvest at a RDI of .349 and 50 trees per acre. Illustration 150548a.004 shows the forest when harvested to portray the understory reinitiation stage of forest development (20 trees per acre, RDI of .167, with trees ranging in size from 22 to 34 inches DBH). Illustrations 150548a. 005 and 006 show the harvested stand 20 years and 50 years later. Another type of selection harvest prescription to be applied in areas (approximately 1/5 to 1 acre in size) where 3 or more trees with old-growth characteristics are encountered is as follows: second growth trees will be selectively harvested from around old-growth trees and for a radius of 200-feet around the old-growth patch. An average of 16 to 25 trees per acre will be left in the 200-foot radius area. The purpose of this is to ensure the survival of the old-growth trees and to create vertical stand structure over time. The leave trees should be healthy and composed of all crown classes with live crown ratios of 30% or more, straight boles and full, conical shaped crowns. This technique will help to develop stands that are multi-species and uneven-aged.

Pine series sites with oak species and whiteleaf manzanita present will be selection harvested in order to reduce stocking levels of desired species, thus improving their vigor. This will also create diverse stand structure when a new age class of

pine trees is established below the existing vegetation. 16 to 25 of the largest conifer trees per acre would remain as well as an additional 10 to 20 ft^2 BA/AC of 7 to 11 inch DBH trees. All hardwood trees would also remain on site.

Ponderosa pine/native grass plant associations are also present. These areas will be treated so that pine regeneration can be established beneath the existing pine trees. All of the Douglas-fir trees that have encroached upon the pine sites will be removed, except for 60 to 80 ft^2 BA/AC that will be left standing around these areas for a radius equal to the average height of the existing stand.

4. Selection Harvesting for the Purpose of Releasing Natural Douglas-fir Seedlings and Saplings

In areas where closely spaced Douglas-fir seedlings and saplings are found beneath an overstory of mature trees, selection harvesting can be employed to remove some of the mature trees. It is recommended that no less than 16 of the largest, healthiest trees per acre of various crown classes be left over the Douglas-fir regeneration. The areas of regeneration must be 1/7-acre in size (88-foot diameter) or larger. By removing overstory trees, the seedlings will be released to grow and vertical stand structure will be enhanced over time.

5. Commercial Thinning of Pole Stands

Three situations are common: 1.) There are dense, decadent pole stands on aspects that receive sun for most of the day. The Douglas-fir is short in height and poison oak and grasses are common in the understory; 2.) Decadent patches of trees may be found with the majority of the trees having crown ratios of 30% or less; and 3.) There are thrifty, young stands with good crown ratios (30% or more) on cool, moist sites.

For the first two situations only, trees with crown ratios of 30% or more will be marked to leave on a 3 to 15-foot crown spacing. Trees with crown ratios of less than 30% will be harvested. Sometimes openings less than 1-acre in size may result.

Thrifty stands should also be marked to a 3 to 15-foot crown spacing but due to better site conditions and trees with high crown ratios, more basal area per acre will probably remain.

Table 5 shows the benefits of commercial thinning in regard to the capture of future tree mortality and an increase in tree growth. OI unit 150258 was modeled in Organon to provide data for the table.

Table 5. Description of O.I. Unit 150258 With and Without Silvicultural Treatment.

Existing Stand: 150258 (Pole stand)

Stand Age	Trees/ Acre	Basal Area	Scribner Volume	10 Year Change in Volume
106	577	197	18,148	-------

Future Growth of Stand if Not Treated (note the decrease in trees/acre through natural mortality):

116	482	195	21,671	3,523
126	412	197	24,651	2,981
136	359	200	27,617	2,966
146	317	203	30,857	3,240
156	283	207	34,019	3,162

***Future Growth if Stand is Thinned to a Relative Density of .35 (103 ft^2 Basal Area/Acre):**

116	163	114	15,363	------
126	157	128	18,693	3,330
136	152	143	22,580	3,887
146	148	156	26,415	3,835
156	143	170	30,392	3,977

* Note: Treated stands grow larger for the last 4 decades than untreated stands.

SVS illustration 150258z.001 is a pole sized Douglas-fir stand (trees 5 to 11 inches DBH) that has dry site characteristics (T39S-R3W-25). Presently the stand has 576 trees per acre and a relative density index (RDI) of .746. Illustration 150258z.003 shows the stand after harvest (173 trees per acre at a RDI of .349). Illustration 150258z.004 shows the treated stand 20 years later (157 trees per acre, RDI of .409, and trees ranging in size from 8 to 38 inches DBH).

6. Shrubland and Woodland Treatments

Selected noncommercial treatment areas (shrublands and woodlands) will be treated by intermediate treatments (precommercial and commercial thinning), the individual tree selection method, and prescribed burning.

The objectives for treating the woodlands are as follows: reduce the fire hazard by thinning all vegetation and eliminating all ladder fuels; restore oak/native grass plant associations; enhance the vigor and quality of the hardwood species (mainly oak to induce acorn crops); use the coppice method to introduce another age class of hardwood species; and decrease the abundance of Douglas-fir and shrub species.

Individual, merchantable Douglas-fir trees can be harvested if ponderosa pine trees are also present (this saves the possible habitat and woody debris component of the ecosystem). Strips or patches of merchantable conifers and hardwoods within the woodlands, where favorable aspects and microenvironments exist, should be thinned to approximately 36 trees per acre (1 to 10 of these trees being conifers). Douglas-fir seedlings through the pole timber size classes should be cut. An occasional Douglas-fir tree may be left if no pine or incense cedar are available to leave. All trees with old-growth characteristics should remain and all the vegetation beneath these trees should be cut to ensure their survival. Cut suppressed and intermediate crown class oak trees to establish stump sprouts. Old, tall whiteleaf manzanita shrubs should remain that produce large berry crops. All other whiteleaf manzanita should be cut. Wedgeleaf ceanothus is also desired, but should be thinned to stimulate sprouting. The wedgeleaf ceanothus shrubs should be cut to heights varying from 6 inches to 3 feet.

The objectives for treating the shrublands are as follows: increase wildlife forage production and quality, decrease fire hazard by reducing the stocking levels and ladder fuels of the shrub species, eliminate or reduce the abundance of noxious weeds, and prevent the encroachment of Douglas-fir.

Individual, merchantable Douglas-fir trees can be harvested if ponderosa pine trees are also present. Douglas-fir seedlings through the pole timber size classes should be cut. All trees with old-growth characteristics should remain and all the vegetation beneath these trees should be cut to ensure their survival. All ponderosa pine and incense cedar trees should be retained. All oak trees except for trees less than 6 inches DBH with crown ratios of less than 10% shall remain. Leave old, tall whiteleaf manzanita shrubs (but prune the lower ladder fuel branches) that produce large berry crops at a 15 to 25-foot crown spacing. All other whiteleaf manzanita should also be cut to the 15 to 25-foot crown spacing. Wedgeleaf ceanothus should also be left, but cut the shrubs to various heights to stimulate sprouting. The wedgeleaf ceanothus

shrubs should be cut to heights varying from 6 inches to 3 feet. Small patches of starthistle should be burned by piling slash on top of the patches and then burning them.

Dense manzanita patches can be thinned by cutting a series of trails to desired vegetation such as oak trees. Prescribed burning will also be used where understory fuels are light in the shrub lands and woodlands.

D. Prevention/Avoidance Strategies

Competing vegetation can be shrub, tree, or herbaceous species. When the land management objective is timber production, shrub and hardwood tree species are considered as "competing" for the available growing space. When the land management objective is forage production, tree species may be considered as the undesirable species. Because of the large area and the variable site conditions of the proposed project area, a variety of competing plant species are likely in all of the vegetation condition classes.

Competing vegetation may become a problem in the areas harvested by the single tree selection method. Here large openings in the crown canopy layer will be created. Openings as large as 20 to 35 feet between tree crowns may be created and heavy slash accumulations are anticipated. In the PSME/BENE plant association, California hazel, dwarf Oregongrape, thimbleberry, and creambrush oceanspray may become established, or resprout, at the same time as the conifer regeneration. Gravelly soils can compound this problem. It is recommended that prescribed fire (cool underburning) be used in these areas to alleviate the fire hazard and for establishing Douglas-fir regeneration. As an alternative, slash could be handpiled on top of existing patches of shrubs and burned.

In the PSME/RHDI-BEPI or PSME/RHDI plant associations, poison oak, deerbrush ceanothus, whiteleaf manzanita and grass species are likely to invade. Prescribed burning may suppress these species long enough for conifers to become established, but fire will stimulate the growth of grass and ceanothus species. Fire may also kill desired tree species if their roots are too close to the soil surface (this may occur where the organic matter on the soil surface is 2 inches deep or greater). Prescribed underburning is appropriate for reducing areas of dense grass, shrubs, and herbaceous species for the purpose of reducing competition for available soil water. In the pine series forests, prescribed fire is also essential for preparing suitable seedbeds for the pine seed. Scalping is also an alternative for reducing the competing grass and ceanothus species. Deerbrush ceanothus and hardwood stump sprouts may also become a problem in these plant associations after the use of fire. Therefore, in the area harvested by the single tree selection method it is recommended that logging slash be handpiled and burned where the regeneration of deerbrush ceanothus would be a severe problem. Prescribed burning can then be used at a later time (3 to 10 years) to control competing vegetation. From an economics standpoint, prescribed underburning is less expensive than mechanical removal.

The same problems will probably be experienced in the group selection harvest areas and the same treatment is prescribed.

After timber harvesting in the commercial thinning areas, shrub and grass species may become established after harvest, but this vegetation will again become suppressed when the crown canopy layer begins to close. Pacific madrone and oak tree species should not be a problem in regard to competing for available growing space in the thinned areas. The majority of these species are suppressed, well below the height of the codominant and dominant conifer trees and will probably not release. The number of these small diameter trees in the understory (4 trees per acre) is not perceived to be a problem. Prescribed underburning would be appropriate where dense mats of grass and other herbaceous vegetation will compete for soil water with the tree species.

No competing vegetation problems are anticipated in the hardwood/woodlands and shrublands if future maintenance of these areas is performed with prescribed fire as planned. In some oak woodlands, whiteleaf manzanita and Douglas-fir will probably encroach again, but cool underburning every 3 to 10 years after the first manual treatment should control these species. The oak woodlands will also be seeded with native grass species and the grasses may out- compete the manzanita, Douglas-fir, and even noxious weed and non-native grass species. The same philosophy applies to the shrublands.

IV. Implementation Plan

A. Marking Guidelines

See the attached Appendix A (Marking Guidelines) which describes how the silvicultural methods will be applied to the various vegetation condition classes and designated areas for treatment.

B. Recommended Design Features

The following treatments should be applied to respective EA units:

1. Commercial Timber Harvest Units

a. In units where the single tree and group selection methods are used, logging slash should be handpiled and burned (swamper burning). Precommercial thinning should also occur before the handpiling and burning. This site preparation treatment should be used in these areas so that early seral species can be planted.

b. In units where only commercial thinning was performed, logging slash should be lopped and scattered if the tree tops are removed. If tops are not removed the slash should be handpiled and burned (swamper burning). Prescribed, cool underburning in the fall would benefit some Douglas-fir timber stands that have dense mats of grass and shrub species, and where deerbrush ceanothus will not be a problem. Prescribed fall underburning is also recommended in the pine series forest stands in order to prepare suitable seedbeds.

c. After timber harvest, non-merchantable trees with undesirable silvicultural characteristics should be slashed. In areas where precommercial thinning is prescribed, all non-merchantable trees should be cut except the largest live conifer trees that meet the following criteria:

1) Minimum 4-inch terminal leader with at least the top 40 % of the tree containing live limbs.

2) Non-chlorotic, light or dark green with very little or no yellowish tint.

3) Undamaged top.

4) Free of visible disease, cankers, fire damage, or blister rust.

5) Demonstrates good form and vigor.

6) No multiple tops or ramiforms.

In the absence of conifers that meet the above definition for an acceptable crop tree, include any live conifer seedling that is at least three (3) feet tall that falls within the spacing guidelines.
In the absence of conifer trees, hardwoods will be considered acceptable crop trees. The order of preference will be bigleaf maple, any oak species, Oregon ash and Pacific madrone. Space the acceptable conifer and hardwood trees at a variable spacing (12 to 18 feet).

In all prescription areas 1/7-acre in size and larger, where overstory trees were marked to release healthy, Douglas-fir seedlings through saplings, the natural regeneration would be precommercially thinned. Seedlings (0-2 inches DBH) should be thinned to a 12 x 12-foot spacing; saplings (2.1 to 4 inches DBH) to an 16 x 16-foot spacing; and poles (4.1 to 7 inches DBH to a 20 x 20-foot spacing.

Throughout the entire project area, all saplings through pole (7 inch DBH and smaller trees) timber should be slashed within the dripline of the old-growth trees that were released with the 15 to 25-foot crown spacing.

2. Pine Slash Disposal to Prevent *Ips* Pine Engraver Beetle Outbreaks

In all pine series stands, logging slash should not be handpiled because this is beneficial for *Ips pini*. *Ips* have several generations per year, so some small (preferably smaller than 4 inches in diameter) green slash should be available spring through summer to absorb populations. Logging slash should be as small as possible and scattered into openings if possible, which would allow the slash to dry and kill the beetle larvae. Slash should only be created through the end of December. The last emerging adults will overwinter in the duff, and if there is no fresh green slash available when they emerge in the spring, they will disperse. Cool, fall prescribed burning is an option for slash removal as long as tree roots are not damaged. Stressed trees are subject to beetle attack.

In all pine series stands, all pine logging slash shall remain within the units to avoid large accumulations of non-merchantable pine material in logging decks.

3. Noncommercial Hardwood/Woodland Units

a. Seed native grasses after treatment.

b. Leave a 350 x 125-foot untreated area for every 10 acres in every unit.

c. Harvest and yard specified merchantable conifer timber within shrublands and woodlands where stand densities are too high.

C. Coarse Woody Material

Information Bulletin No. OR-97-064 (USDOI, 1996) states, "prescriptions should account for current habitat conditions and the timing and development of subsequent snags and coarse woody material (CWM) until the next stand once again begins to contribute CWM. Leaving green trees and felling to provide a source for CWM should be part of the partial harvest prescription."

Historically, much of the project area was very open with few old conifer trees per acre. Only on northerly aspects with moist environments were uniform forest stands found. The forests of today originated from the late 1800 and early 1900 fires and fire suppression. As a result of fire suppression the present day forests are now overstocked. Tree vigor began to decline as early as 1900. The overstocked stands along with the drought conditions of the 1980's through 1995 have allowed for extensive tree mortality. In some places there may be more snags today than in historic times. Therefore, the 12.4 tons/acre of CWM on site may well reflect average conditions for mature seral stands on harsh sites.

Because of the unique habitat created by the large coarse wood and the surrounding vegetation it is recommended that the existing microenvironment remain intact. Where coarse woody material is found that is 20 inches in diameter at the small end, and a minimum of 8 feet long, all trees immediately surrounding this wood shall be left standing to provide shade. This recommendation will apply to all prescription areas.

The majority of the project area will receive intermediate type harvest methods (commercial thinning). It is suggested that all Stage 1 snags be left in the interior of homogeneous conifer stands. Homogeneous conifer stands should be inventoried after harvesting by wildlife biologists to see if snag requirements have been met. If not, damaged or diseased trees should be designated for girdling. In areas adjacent to shrublands and woodlands where tree mortality has been high, it is recommended that 25% of the snags less than 17 inches DBH and 66% of the snags 17 inches DBH and larger be retained. Stand inventory data for the project area indicates that there is a range of 13 to 91 trees/acre with an average DBH of 12.2 inches that are damaged. Some of these trees may also be retained as green tree retention. The information bulletin also states that 15 to 20% ground cover of downed woody material or 4.5 to 10 tons of fresh downed woody debris is adequate after timber harvest. Therefore, the debris created by partial harvesting in combination with existing CWM and the recommended snags to be retained is sufficient to meet CWM requirements.

D. Subsequent Treatment Planned

The proposed silvicultural methods of Alternative II suggests uneven-aged management over very long periods of time (over 100 years) to create structurally diverse, multi-cohort timber stands as proposed in the Medford District RMP.

After the proposed treatments are performed, the options for future treatment are many. Future management objectives will determine when the commercial forest lands are harvested again. Landscape analysis and design should also determine which types of silvicultural treatments are applied and in what pattern across the landscape. **ORGANON** analysis shows that if the objective is to perform a regeneration harvest when there are 16 trees per acre, 20 inches DBH and larger available to leave, the mid-sized and mature vegetation condition classes should be entered in 10 to 40 years. For pole stands to reach this condition it would take approximately 20 to 40 years. If the management objective is to manage strictly by density levels (high RDI), pole stands through mature stands can be entered in 30 to 90 years.

At the time of the next stand entry, existing group selection areas can be released and additional group selection areas can be created.

The single tree selection and group selection harvested stands should be planted with the appropriate planting stock. The pine group selection areas should be planted with 1-0 or 1-1 ponderosa pine stock at a 16-foot spacing (40 trees/acre). The 1/6 and 1/7-acre Douglas-fir group selection areas should not have to be planted.

The single tree selection harvest areas around the patches of mature/old-growth trees should be planted also. These areas

should be mapped as pine or Douglas-fir sites and planted accordingly. Two year old or older planting stock should be used. The pine sites should be planted with 70% ponderosa pine, 25% sugar pine, and 5% incense cedar at a 16-foot spacing. Douglas-fir sites should be planted with 100% Douglas-fir at the same rate of stocking. The planted sites should have stocking surveys and maintenance performed as recommended by BLM standards.

After manually treating the hardwood/woodlands, shrublands, and defensible fuel profile zones (DFPZ's), prescribed fire should be used for the maintenance of these areas. In the oak woodlands where the production of frequent acorn crops is desired, cool, prescribed burning should be performed every 3 to 5 years. The shrublands can be burned as necessary to develop the desired seral stages of vegetation.

E. Avoidance Strategies for Animal Damage and Forest Health

At this time no problems with animals are anticipated. After performing density management, more early seral stage vegetation will become established and blacktail deer populations may increase. Unburned slash piles may create habitat for rabbit species and isolated pockets of seedling damage may result. Tree tubing may be required at a later date.

After the trees respond to release, they should be more resilient to pathogens and insects. Density control of the forest stands is essential to prevent the occurrence of these biotic agents. Any heavily infected dwarf mistletoe stands should be managed over time to lower the rate of infection. In the group selection areas seedlings and saplings with mistletoe should be thinned-out.

F. Monitoring Recommendations

The monitoring plan for the Bobar Project has been expatiated by an interdisciplinary team during the environmental analysis process. Monitoring will be focused on selected study areas. In general, site characteristics and trends will be described and measured before and after activities take place. Monitoring is necessary to validate proposed prescriptions and assumptions made about the prescriptions to see that stated objectives are attained. The following disciplines will be monitored as described:

1. Silviculture/Forest Health

The forest stands being monitored are not in the Bobar Project. They are
stands representative of the stand vigor and commercial thinning issues commonly found in the Applegate Adaptive Management Area and are located in the Lower Thompson Creek vicinity.

a. Forest stands are being monitored for vigor by using relative density as an index, leaf area index and sapwood radial growth.

b. Individual tree growth is being measured over time in representative stands on permanent plots in a releasability study. Large and old-growth ponderosa pine and Douglas-fir are of particular interest.

c. Occurrence of natural regeneration and survival of planted seedlings in established group selection and regeneration harvest areas.

d. Oak woodlands will be monitored for vegetational response to fire and thinning.

2. Fuel Hazard and Risk

Fuel characteristics (loading) will be measured before and after treatments in all vegetation types. Size and composition of fuels related to structure will be assessed at regular intervals. The potential fire hazard and rate of spread will be evaluated for treated and untreated areas.
Particulate matter generation will be measured during selected prescribed burning episodes.

3. Soils

Soils will be monitored for erosion and compaction by type and location before and after prescribed treatments.

4. Wildlife

Wildlife populations and habitat will be inventoried on both treated and untreated areas. In addition, the layout of protection buffers, Siskiyou salamander habitat, spotted owl sites, and great grey owl sites will be monitored.

5. Air Quality

Particulate matter and air opacity are being monitored at the Provolt Seed Orchard air quality facility as part of the Rogue River Basin Interagency Smoke Monitoring Plan.

6. Contracts

Contract work will be developed and performed to meet watershed analysis objectives. Contract work results will be monitored.

Literature Cited

Agee, J. 1993. *Fire ecology of Pacific northwest forest*. Island Press, Washington, D.C.

Atzet, T. and D.L. Wheeler. 1984. *Preliminary plant associations of the Siskiyou mountain province*. USDA Forest Service, Siskiyou National Forest, Grants Pass, OR.

Atzet, T. et.al. 1996. *Field Guide to the Forested Plant Associations of Southwestern Oregon*. U.S. Department of Agriculture, Forest Service.

Franklin, et.al. 1981. *Ecological characteristics of old-growth Douglas-fir forests*. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, General Technical Report.

Franklin, Jerry F. and Thomas A. Spies. 1991. *Ecological Definitions of Old-Growth Douglas-Fir Forests*. Wildlife and Vegetation of Unmanaged Douglas-Fir Forests, USDA General Technical Report PNW-GTR-285, pp. 61-69. Pacific Northwest Research Station.

Hawksworth, Frank G. 1977. *The 6-Class Dwarf Mistletoe Rating System*. USDA Forest Service General Technical Report RM-48. Fort Collins, CO.

Hayes, et.al. 1997. *Wildlife Response to Thinning Young Forests in the Pacific Northwest*. Journal of Forestry,

August 1997, pp 28-33.

U.S. Department of Agriculture, Forest Service. 1986. *Interim Definitions for Old-Growth Douglas-Fir and Mixed-Conifer Forests in the Pacific Northwest and California*. Research Note PNW-447, Pacific Northwest Research Station.

U.S. Department of Agriculture, Forest Service and U.S. Department of Interior, Bureau of Land Management. 1994a. *Record of decision for amendments to Forest Service and Bureau of Land Management planning documents within the Range of the Northern Spotted Owl and standards and guidelines for management of habitat for late successional and old-growth forest related species within the range of the Northern Spotted Owl*. Portland, OR.

U.S. Department of Agriculture, Forest Service, Rogue River and Siskiyou National Forests, Pacific Northwest Research Station and U.S. Department of Interior, Bureau of Land Management, Medford District. 1994c. *Applegate Adaptive Management Area Ecosystem Health Assessment.* Medford, OR.

U.S. Department of the Interior, Bureau of Land Management, Oregon State Office. Information Bulletin No. OR-97-064. 1996. *Implementation of Coarse Woody Debris Standards and Guidelines.* Portland, OR.

U.S. Department of the Interior, Bureau of Land Management, Medford District. 1994b. *Medford District proposed resource management plan/environmental impact statement.* Medford, OR.

U.S. Department of the Interior, Bureau of Land Management, Medford District. 1995. *Middle Applegate Watershed Analysis*. Medford, OR.

U.S. Department of the Interior, Bureau of Land Management, Oregon State Office. 1989. *Final EIS for the control of competing vegetation in Western Oregon*. Portland, OR.

GLOSSARY

Aggradation	The geologic process in which inorganic materials carried downstream are deposited in stream beds, flood plains and other water bodies resulting in a rise in elevation.
Association, plant	A stand or group of stands made up of plants characterized by a definite floristic composition consisting of uniformity in physiognomy and structure and uniform habitat conditions. The term generally is reserved for a climax community.
Coppice Method	Any type of cutting in which dependence is placed mainly on vegetative reproduction.
Defensible Fuel Profile Zone (DFPZ)	An area where tree densities are low enough to reduce the occurrence of catastrophic wildfire by lowering the spread rate and the resistance to control. The zone has light ground fuels shaded by a stand of larger, fire resistant trees where crown closure does not

exceed 40%.

Dripline	The outer radius of the tree crown where the limbs touch the soil surface in a downward vertical projection.
Early Seral	Refers to shade intolerant tree species that pioneer a site after a disturbance.
Homogenous	Of the same kind or nature; consisting of similar parts or elements; opposed to heterogeneous.
Live Crown Ratio	The length in feet of the live tree crown divided by the total tree height. Crown length is the total tree height minus the height to crown base.
Microenvironment	The immediate environment surrounding an organism. Variables of concern may be temperature, atmospheric moisture, radiant energy flux, wind, oxygen and CO_2 concentrations, temperature and thermal conductivity of the substrate, and possibly spectral distribution of radiation.
Multicohort	Stands where the trees arose after two or more disturbances (uneven-aged or all-aged).
ORGANON	(**OR**egon **G**rowth **AN**alysis and projecti**ON**) growth and yield model for southwest Oregon forest stands.
Permeability, soil	The ease with which gases, liquids, or plant roots penetrate or pass through a bulk mass of soil or a layer of soil.
Planting Stock	Tree seedlings grown in controlled environments for lifting or in containers that can be transplanted in the forest. The seedlings are developed morphologically and physiologically to match particular operational environments.
Relative Density Index	The ratio of actual stand density to the maximum stand density attainable in a stand with the same mean tree volume.
Scalping	Scraping away undesirable vegetation from spots of a specified radius where the trees are to be planted.
Selection Cutting	A method of uneven-aged management involving the harvesting of single trees from stands (single-tree selection) or in groups (group selection) without harvesting the entire stand at any one time.
Series	Term for a group of habitat types having the same tree species dominant at climax; for example, white spruce series or black spruce series.
SVS	Stand Visualization System. SVS generates graphic images depicting stand conditions represented by a list of individual stand components, e.g., trees, shrubs, and down material. Images produced using SVS help communicate silvicultural treatments and

	forest management alternatives to a variety of audiences.
Swamper Burning	The act of piling logging slash and burning at the same time.
Trophic Dynamics	Energy flow through a community organized into several tropic levels. Pertaining to nutrition.

Bobar Landscape Project
Appendix C

Project Design Features

The Project Design Features (PDF's) with an asterisk (*) are Best Management Practices (BMPs) to reduce nonpoint source pollution to the maximum extent practicable. BMPs are considered the primary mechanisms to achieve Oregon Water Quality standards. Implementation of PDFs in addition to establishment of Riparian Reserves would equal or exceed Oregon State Forest Practice Rules. BMP effectiveness monitoring would be conducted and where necessary, BMPs modified to ensure compliance with Oregon Water Quality Standards. The following PDFs apply to Alternatives B and C.

Roads (See Appendix D for details)

Road Construction and Renovation

a. A seasonal restriction for road construction and renovation from October 15 to May 15 would be placed in the contract. This restriction could be waived under dry conditions and a specific erosion control plan (e.g. rocking, water barring, seeding, mulching, barricading).* Road construction and renovation would not occur during the winter months when the potential for soil erosion and water quality degradation exists. All construction activities would be stopped during a rain event of 0.2 inches or more within a 24-hour period or if determined by the administrative officer that resource damage would occur if construction is not halted. If on-site information is inadequate, measurements from the nearest Remote Automated Weather Station would be used. Construction activities would not occur for at least 48 hours after rainfall has stopped or on approval by the Contract Administrator.

b. Bare soil due to road construction/renovation would be protected and stabilized prior to fall rains.*

c. The fill slopes on all new roads would be seeded with native or approved seed, fertilized and mulched. No fertilizer would be spread within Riparian Reserves.*

d. Where possible, rolling grades and out sloping would be used on road grades that are less than 8%. These design features would be used to reduce concentration of flows and minimize accumulation of water from road drainage.*

e. Slash from road construction would be windrowed at the base of the fill slope to catch sediment.*

f. Temporary roads would be obliterated at the completion of log haul and site preparation. The roads would be water barred, mulched and barricaded if use is not competed by October 15.*

g. All new roads would be blocked with the intent of preventing unauthorized use after construction.

Road Decommissioning

a. Roads would be decommissioned using both natural and mechanical methods.*

Types of decommissioning are as follows:

- Natural Decommission - some roads are presently well drained and have vegetation growing on them. They may also have trees and brush encroaching from the sides and trees that have fallen across them. Sections of these roads would be allowed to decommission naturally but may include some selective

ripping, removal of drainage structures, construction of water bars and barricades.*

- Mechanical Decommission - Roads would be decommissioned mechanically. This usually includes ripping, removing drainage structures, seeding and/or planting, mulching, constructing water bars and barricades.*

b. Road decommissioning would occur the final dry season (usually May 15 to October 15) of the contract, while road construction and renovation would occur the first year of the contract in order to reduce the amount of soil disturbance occurring in one season as a result of road work.*

c. Stream crossings would be reestablished to the natural stream gradient. This would be accomplished by removing the culvert and the road fill within the stream crossing areas. Fill material would be removed to bank full width. Stream side slopes would be reestablished to natural contours then seeded (with native or approved seed) and mulched. Excavated material would be removed from stream crossing areas and placed at stable locations.* Decommissioned roads would be water barred on each side of stream crossings in order to adequately filter road surface runoff and minimize sediment transport to streams

d. Areas of disturbed ground on all decommissioned roads would be seeded with native or approved seed, fertilized, and mulched. No fertilizer would be spread within Riparian Reserves.*

Hauling Restrictions

A seasonal hauling restriction would be required on roads during the wet season (October 15 to May 15). This would protect roads from damage and decrease the amount of sedimentation that would occur. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions of the roads.

Quarries

Rock would be used to stabilize and minimize erosion on selected roads and landings.* Rock would be obtained from the existing quarry located in E1/2SW1/4 Section 25, and SE1/4NE1/4 Section 34, T.39S., R.3W. Rock encountered during construction activities could be used for road stabilization.

Culvert Installation/Replacement

a. Instream work would occur from July 1 - September 15 for all fish-bearing streams and for nonfish-bearing streams that are flowing during this work period.*

b. Road approaches at all stream crossings would be as near a right angle to the stream as possible to minimize disturbance to stream banks and riparian habitat.*

c. Road crossings on all fish-bearing streams would be designed to maintain natural streambed substrate and site gradient where feasible, while minimizing long-term maintenance needs; the specific design would also be based on expected longevity and economics.*

d. Stream crossing culverts that are replaced would be sized to accommodate 100-year flood events. The width of a crossing structure on fish bearing streams would be at least as wide as the mean bank full width at the crossing site. Deviation to this general rule would be approved by the hydrologist and fisheries biologist on a case-by-case basis.*

e. During instream work, all perennial streams would be diverted around the work area in a manner (e.g. a pipe or lined ditch) that would minimize stream sedimentation. The contractor would be required to submit a plan for water diversion before instream work begins. Fish screens would be used on all diversions on fish bearing streams. The diverted stream would not be returned to the channel through the project area until all instream work had been completed. The resource area fish biologist would be consulted before deviating from this practice. If it is impractical to dewater a stream channel, the work would be scheduled toward the end of the instream work period.*

f. The use of settling ponds, straw bales, geotextile fabric or coconut fiber logs/bales would be used to reduce movement of sediment downstream from the project site.*

g. On fish bearing streams the bottom of stream crossing structures may be lined with 1-3 foot diameter boulders to restore streambed habitat complexity inside new crossing structures. Boulders that are placed in structures must be large (high) enough so that they are not buried by streambed substrate that may have been deposited immediately upstream of the inlet of the original pipe. A prediction model would be used to determine the size of boulder needed to ensure stability at the estimated 100 year peak flow.*

h. Stream crossing structures would be designed to ensure upstream movement of aquatic species.*

i. Fill material over stream crossing structures would be stabilized as soon as possible after construction has been completed, before October 15. Exposed soils would be seeded and mulched. Work would be temporarily suspended if rain saturates soils to the extent that there is potential for environmental damage, including movement of sediment from the road to the stream.*

j. Waste stockpile and borrow sites would not be located within Riparian Reserves.*

k. During construction of instream structures the contractor would be responsible for meeting all state and federal requirements for maintaining water quality. Standard contract stipulations would include the following:

- Heavy equipment would be inspected and cleaned before moving onto the project site in order to remove oil and grease, noxious weeds and excessive soil.*
- Hydraulic fluid and fuel lines on heavy mechanized equipment must be in proper working condition in order to avoid leakage into streams.*
- Diesel fuel, oil, hydraulic fluid and other hazardous materials and contaminated soil would be removed from the site and disposed of in accordance with DEQ regulations. Areas that have been saturated with toxic materials would be excavated to a depth of 12 inches beyond the contaminated material or as required by DEQ.*
- Equipment refueling would be conducted within a confined area outside Riparian Reserves.*
- Spill containment booms or other equipment would be used, as required by DEQ.*

- Equipment containing toxic fluids would not be stored in or near (within 300') a stream channel anytime.*

Dust Abatement
Dust abatement would enhance driver safety and protect the road surface by stabilizing and binding the aggregate road surface. Water, lignin, magnesium chloride, or bituminous surface treatment (BST) would be used. BST may appear to be a permanent surface improvement. After log and rock haul, however, the road may be allowed to return to a rocked road.*

Road Maintenance
BLM-administered roads would be maintained on a long-term basis. Minor improvements and design changes may be needed to stabilize and correct conditions that are causing erosion or unsafe situations.*

Road Closures
All natural surface roads would be closed during the wet season.*

Road Use Agreements
The BLM and some large land owners use road use agreements to share road use and road costs. Road use agreements with Superior Lumber Company (M-2000F) would be used for access to BLM lands.

Helicopter Landings

The construction of helicopter landings would occur during the dry season (May 15 to Oct. 15). No construction of new landings or expansion of old landings would be allowed in Riparian Reserves.*

a. Helicopter landings would be treated to reduce soil erosion. Treatment of the running surface would be dependent on site conditions and would include one of the following:

- Subsoil/till or rip, then mulch and seed with native grasses or other approved seed.*
- Surface with durable rock material.*
- No treatment may be necessary where sufficient natural rock occurs.*

b. Fill slopes of helicopter landings would be seeded with native grasses or other approved seed mixes and mulched, except where rock occurs.*

Harvest and Logging Systems

a. Only logging systems which meet all of the project design features would be used for this project.*

b. When operationally feasible, all units would be yarded in such a way that the coarse woody debris remaining after logging would be maintained at, or become greater than, current levels in order to protect the surface soil and maintain productivity.*

c. Wherever trees are cut to be removed, directional felling away from Riparian Reserves, dry draws and irrigation ditches would be practiced. Maximum operational suspension would be practiced to alleviate gouging and other disturbance on draw side slopes and

headwalls. Trees would be felled to the lead in relation to the skid trails. The intent of falling to the lead is to minimize the yarding damage to leave trees and regeneration under conventional yarding systems.*

d. Selective removal of overstory trees to a minimum of 40% canopy closure would be allowed within the population boundaries of the *Cimicifuga elata* populations in the project site. Logging systems would be laid out under the guidance of a botanist to minimize disturbance to individual plants and all logs within the site will be removed from the site by helicopter.

e. All skid trail locations would be approved by BLM. Maximum area in skid trails would be less than 12%. Existing skid trails would be utilized when possible. No use of skid trails in Riparian Reserves. Tractors would be equipped with integral arches to obtain one end log suspension during skidding of the logs. Skid trail locations would avoid ground with slopes over 35 percent and areas with high water tables. The intent is to minimize areas affected by tractors and other mechanical equipment (disturbance, particle displacement, deflection, and compaction) and thus minimize soil productivity loss.*

f. All skid trails would be water barred according to BLM standards. Main tractor skid trails would be blocked with an earth and log barricade where they intersect haul roads. The intent is to minimize erosion and routing of overland flow to streams by decreasing disturbance.*

g. Tractor yarding would occur between June 15 to October 1 or on approval by the Contract Administrator. Some variations in these dates would be permitted dependent upon weather and soil moisture conditions. The intent is to minimize off-site erosion and sedimentation to local waterways.*

h. For all cable yarding, maximum operational suspension would be maintained on slopes greater than 50 percent. Minimum corridor widths *(*generally less than 15 feet in width) would be utilized to assure silvicultural prescriptions and objectives are met. No yarding corridors in Riparian Reserves.*

i. Skyline and tractor yarding would be avoided up and down dry draws. The intent is to minimize occurrence of erosion in existing areas of concentrated surface flow.*

j. No new cable/tractor landings to be constructed in Riparian Reserves. Existing landings should not be expanded and evaluated carefully before use.*

k. Irrigation ditches in the project area would be protected from damage and kept free from slash.*

l. Noise disturbance to local residents would be partially mitigated by regulating operating hours, day, and seasons through portions of the project area. Generally, any helicopter logging closer than ½ mile of a residence would be restricted to an operating period of 8:00 AM to 5:00 PM, Monday through Friday.
Any helicopter logging located ½ to one (1.0) mile from a residence would be restricted to an operating period of 6:00 AM to 6:00 PM, Monday through Saturday; and no operating time restrictions would be enforced when helicopter operations are greater than one (1.0) mile from a residence.

Pre-commercial Thinning of Forested Stands and Non-commercial Thinning of Woodlands and Brushlands

a. Vegetation would be thinned using mechanical and manual techniques of cutting and chipping, such as slashbuster, and/or using hand crews with chainsaws. Slash created by the project would be chipped on site (if using slashbuster), or hand piled and burned if cut by hand crews. No piling in dry draws would be allowed.

b. To minimize loss in soil productivity and surface erosion, the average unit slope for mechanical operations would be less than 35%.* The maximum slope for the slashbuster would be 45%, but only on short pitches less than 300 feet. Any mechanical operations on fragile soils (as shown on the BLM GIS Soils mapping or identified by the Soil Scientist) would be limited to slopes of 25% or less.*

c. Crossings through dry draws would be limited and approved by authorized officer; mechanical equipment would not drive up or down the draw bottoms.

d. Old skidroads would not be opened or driven on without the approval of the authorized officer.* Cut material or slashbuster material will be placed on the running surface of old skid roads or jeep roads that are authorized to be used.* Old skidroads would not be treated near the intersections with system roads in order to provide a visual screen and discourage vehicular access.*

Fuels Treatment

An array of fuel treatments would be utilized in the project area to modify vegetative patterns and reduce high fuel levels. Factors such as existing and projected fuel loading, existing vegetative conditions, slope, and access would be taken into consideration when prescribing the type of fuels management treatment that would be implemented. These treatments include mechanical methods, manual treatments, prescribed burning, or a combination of these treatments. All fuel management activities would meet Aquatic Conservation Strategy and Riparian Reserve objectives.

Manual and Mechanical Treatments

a. Mechanical treatment restrictions would be the same as for pre-commercial and non-commercial thinning as stated above.

b. Manual treatment of fuels consists of hand cutting of existing ladder fuels and then hand piling this material so it can be burned.*

c. No piling in dry draws would be allowed.*

Riparian Reserves

Riparian Reserve Determination

Northwest Forest Plan (NWFP) Riparian Reserves are located on federal lands throughout the project area. In order to ensure that all areas needing Riparian Reserve protection were covered, BLM conducted exhaustive surveys of each drainage within the Bobar project area. The survey crew assessed stream condition, documented the location of wetland and unstable areas, and

determined whether stream channels were perennial, intermittent, or dry draws (NWFP Standards & Guidelines, pages C30-C31). In addition, existing maps were corrected using the new information. For locations of Riparian Reserves, refer to the Riparian Reserve map in the EA file, available by request.

Riparian Reserve widths were determined site-specifically using the guidelines on page C-30 and 31 of the NWFP Standards and Guidelines. Riparian Reserve widths in the Bobar project area are as follows:

- Fish streams: between 360' and 400' slope distance on each side of the stream.
- Perennial nonfish-bearing streams: between 160' and 180' slope distance on each side of the stream.
- Intermittent nonfish-bearing streams: between 100' and 180' slope distance on each side of the stream.
- Unstable and potentially unstable ground: the extent of the unstable and potentially unstable ground. For unstable and potentially unstable areas adjacent to dry draws: 180' slope distance on each side of the draw.
- Springs, seeps and other non-stream wetlands less than one acre in size: 100' slope distance from the edge of the wetland and associated vegetation. This is an increase over the Northwest Forest Plan requirement that Riparian Reserves just extend to the edge of the wetland and associated vegetation for such areas.

Vegetation Treatments in Riparian Reserves

a. Treatments would only take place in Riparian Reserves adjacent to pre-commercial treatments (PCT) and non-commercial treatments (NCT) units. Prior to implementation of any treatments, resource specialists (hydrologist, fisheries, and wildlife biologists) would make a review to assure compliance with the objectives of the Aquatic Conservation Strategy.*

b. Mechanical vegetation treatments would not occur within Riparian Reserves on: fish-bearing and perennial streams; springs, seeps, and wetlands; and unstable and potentially unstable areas.

c. Mechanical vegetation treatments would not occur on short- and long-duration intermittent streams within a minimum of 25 feet from the stream in hardwood/brush stands and 50 feet from streams in conifer stands, or the top of the slope break, whichever is greater.* (This is due to observed differences in soil sensitivity to disturbance between riparian woodland/brush and conifer stands.).

d. Manual vegetation treatments would not occur in the following areas: within 50 feet of fish-bearing and perennial streams; within 50 feet from the edge of springs, seeps, and wetlands; within Riparian Reserves for unstable and potentially unstable areas; and within25 feet of long-duration intermittent streams.*

e. Manual vegetation treatments would occur along short-duration intermittent streams where necessary to reduce fuel loading.

f. Riparian hardwood species such as willow, ash, maple, alder, and black oak would not be thinned.*

g. Thinned material may be Alopped and scattered@ in specific areas where pile burning is not desirable.

h. Crossing channels with vehicles or equipment, including ATVs and slashbuster, would be limited to existing system roads.*

i. No machinery would be driven through riparian areas or stream channels. (Riparian Area: Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water,

and associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows). Where this limitation inhibits access to mechanical treatment units, these units would be treated manually.

j. Piles would not be placed in channel bottoms.

k. Down large woody debris over 16" diameter would not be damaged, driven over, or used for fire wood.

Table 1. Riparian Reserve buffer distances – non-commercial treatment are as

	Manual treatments	**Mechanical treatments**	**Pile burning**
Fish-bearing	50' buffer	Not allowed in RR	50' buffer
Perennial	50' buffer	Not allowed in RR	50' buffer
Long-duration intermittent	25' buffer	50' buffer for machine; can reach in to extent of cutter	25' buffer
Short-duration intermittent	Where necessary (treating through is OK, as prescribed)	50' buffer for machine; can reach in to extent of cutter	No piles in the channel or draw bottoms
Springs/seeps/wetlands	50' buffer	Not allowed in RR	50' buffer
Unstable areas	Not allowed in RR	Not allowed in RR	50' buffer

Prescribed Fire Treatments in Riparian Reserves

PDFs for vegetation treatments in Riparian Reserves would apply to fuels treatments. Site visits by a hydrologist, fish biologist, and/or wildlife biologist may result in more restrictive PDFs for the Riparian Reserve portion of proposed fuel treatment units.*

Pile Burning

a. No mechanical piling would occur in Riparian Reserves.

b. Hand pile burning would not take place within: 50 feet each side of fish-bearing and perennial streams; 50 feet from the edge of springs, seeps, and wetlands; 25 feet each side of long-duration intermittent streams; no piles in channel/draw bottoms of short-duration intermittent streams, or to the top of the slope break for all of the above classifications, whichever is greater.*

c. Treated vegetation could be Alopped and scattered@ in areas where hand pile burning is not allowed.* Where feasible, this vegetation should be dragged outside the no-treatment zone and piled.

Broadcast and Underburning

a. With underburns, no ignition would occur within Riparian Reserves,* but backing fire may be allowed to burn down into a Reserve, especially into the non-riparian portions with fire dependant vegetation such as ceanothus and white oak. This would depend on site-specific analysis.

b. Fire lines would be avoided in Riparian Reserves in order to prevent the creation of Amini roads@ that could route sediment into water bodies.*

c. Foam would not be used in Riparian Reserves.*

Wildlife

Threatened/Endangered Wildlife

The mandatory terms and conditions of the Biological Opinion require the implementation of project design criteria proposed in the Biological Assessment for the BLM, Rogue River and Siskiyou National Forests (BA). These criteria will be incorporated in the design of the timber sales.

Place a seasonal restriction on harvest activities within 0.25 miles of the center of activity for each of the two known northern spotted owl nest sites. This restriction would be in effect from March 1 through June 15 for disturbance activities, such as hauling, and from March 1 through September 30 for removal of habitat within the restricted area. This restriction could be lifted on an annual basis if protocol surveys by the BLM indicate that the site is not reproductive in a given year.

Adopt the same seasonal restriction as outlined above for any new pairs of spotted owls found before or during the sale contract period.

Survey and Manage Species

Surveys for species identified under the Survey and Manage Guidelines of the NFP ROD/FSEIS have been conducted for the proposed project area.

a. No great gray owl nesting sites are known to occur in the area. One known nest site is adjacent to the project area. A seasonal restriction would be in effect from March 1 through July 15 for any treatment activities and hauling within 1/4 mile of active nest site.

b. No known northern goshawk nest sites are within the project area. Any identified northern goshawk nests or activity centers that are located would receive no treatment buffers of approximately 30 acres.

c. Bat roosting and hibernacula sites referred to in the NWFP, including caves, mines, wooden bridges, and old buildings, are not known to occur within the project area. Any mines, mine adits and shafts found that serve as roosts, maternity colonies or hibernacula for any of the five species of bats listed as Survey and Manage/Buffer Protection Species, would be protected with 250 foot protection zones.

d. No survey and manage mollusks have been found in the project area. Any Survey and Manage mollusk species which are located prior to the sale date would receive protection as outlined in the Management Recommendations for Survey and Manage Terrestrial Mollusks, version 2.0, dated, Oct., 1999.

e. To protect areas of Siskiyou Mountain Salamander habitat:

1. Construct hand piles off of exposed rock and talus to the extent possible within existing service contract specifications.
2. Burn hand piles only during periods of cold or wet weather when local BLM biologists have determined that salamanders are not likely to be present on the surface. This would generally be December through February but would be dependant on conditions on a year by year or even week by week basis.

Botany

Federally Endangered Species

Fritillaria gentneri: Known occurrences will be buffered with a 150 foot radius buffer.

Bureau Special Status Species
Camissonia gracilliflor, Cypripedium fasciculatum, Cypripedium montanum, Isopyrum stipitatum, Sedum laxum ssp. Heckneri, Sedum oblanceolatum. Known sites will be buffered with a 150 ft radius buffer.

Northwest Forest Plan Species

Bryoria tortuosa:
In order to protect this species and reduce fire hazard at the same time, the following PDF's will be implemented in known BRTO sites:

a. All manzanita stems greater than or equal to 10" in diameter at the base, or taller than 8 feet will be left undisturbed.

b. No more than 50% of the manzanita stems may be removed from any known BRTO site.

c. Leave all Pine, Oak, and Manzanita with yellow and black striped flagging uncut and undamaged.

d. Leave all Manzanita stems uncut within 30' of any yellow and black striped flagging.

e. No piling of slash within the dripline of any Oak species with yellow and black striped flagging tied to it.

f. No piling of slash within the dripline of any Pine species (Ponderosa, Sugar, Knobcone, Western White) equal to or greater than 12" dbh. Pile slash away from all live Pine trees less than 12" that are left uncut after treatment. This allows for recruitment of younger pines which will provide future substrate for BRTO.

Bobar Landscape Project
Appendix D

Road Construction, Renovation, Decommission

Table D-1.
Alternatives: Proposed improvements on existing roads.

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type[1]	Control[2]	Possible Improvements: Depth (inches) and Type[3]	Seasonal Restriction[4] (for log hauling)
39-2-7.1	2.68	4" GRR	BLM	-	1
39-2-30.1	0.70	NAT	BLM	4"ASC	1
39-2-30.2	1.22	NAT	BLM	road realignment	1
39-2-30.3	1.19	NAT	BLM	4"ASC	1
39-2-32.0A	1.30	8"ABC	BLM	4"ASC	2
39-2-32.0B	0.85	8"ABC	BLM	4"ASC	2
39-2-32.0C	0.81	8"ABC	BLM	4"ASC	2
39-3-24.0A	0.36	6"ABC/6"ASC	BLM	-	2
39-3-24.0B1	1.16	10"GRR	BLM	-	2
39-3-24.0B2	1.14	6"PRR	BLM	4"ASC	2
39-3-24.0B3	2.05	6"PRR	BLM	4"ASC	2
39-3-24.0C	0.23	NAT	BLM	4"ASC	1
39-3-26.0	1.01	6"GRR	BLM	4"ASC	2
39-3-27.0A	0.38	6"GRR	BLM	4"ASC	2
39-3-27.1A1	0.28	6"GRR	BLM	4"ASC	2
39-3-27.1A2	0.21	6"GRR	BLM	4"ASC	2
39-3-27.2A	0.34	6"GRR	BLM	4"ASC	2
39-3-27.2B1	0.78	6"GRR	BLM	4"ASC	2
39-3-27.2B2	0.25	6"GRR	BLM	4"ASC	2
39-3-27.2B3	0.23	6"GRR	BLM	4"ASC	2
39-3-27.2B4	3.66	6"GRR	BLM	4"ASC	2
39-3-27.2C	0.25	6"GRR	BLM	4"ASC	2
39-3-27.2D	0.76	NAT	BLM	8"ASC	1
39-3-28.1	0.71	NAT	BLM	4"ASC	1
39-3-28.2	0.10	NAT	BLM	4"ASC	1
39-3-35.0	1.02	NAT	BLM	4"ASC	1
39-3-36.0	0.81	6"GRR	BLM	4"ASC	2
39-3-36.2	0.17	NAT	BLM	-	1
40-2-5.1	0.13	NAT	BLM	-	1

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type[1]	Control[2]	Possible Improvements: Depth (inches) and Type[3]	Seasonal Restriction[4] (for log hauling)
40-2-5.3	0.26	4"ABC	BLM	-	1
40-2-7.1A	0.68	4"ABC	BLM	4"ASC	1
40-2-7.1B	1.20	4"ABC	BLM	4"ASC	1
40-2-7.1C	0.71	4"ABC	BLM	4"ASC	1
40-2-7.2	1.25	4"ABC	BLM	4"ASC	1
Total Mileage:	26.2				

1) NAT = natural; ASC = aggregate surface course; ABC = aggregate base course; PRR = pit run rock; GRR = grid rolled.
2) BLM = Bureau of Land Management;
3) - = no improvement; ASC = aggregate surface course; ABC = aggregate base course; PRR = pit run rock; GRR = grid rolled; BST = bituminous surface treatment; DI= Drainage Improvement; SR=Spot Rock
4) 0 = no restrictions; 1 = hauling restricted between 10/15 and 5/15, 2 = hauling restricted between 11/15 and 4/15.

Table D-2.
Alternative: Proposed new road construction in the Bobar project area.

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type [1]	Control [2]	Possible Improve-ments: Depth (inches) and Type [3]	Seasonal Restriction [4] (for log hauling)
39-2-30.0	0.70	-	BLM	4"ASC	1
39-2-30.1	0.70	-	BLM	4"ASC	1
39-2-30.3	0.50	-	BLM	4"ASC	1
39-2-31.0	1.30	-	BLM	4"ASC, Gate	1
39-3-14.0	0.40	-	BLM	8"ASC	1
39-3-15.1	2.40	-	BLM	8"ASC, Gate	1
Total Mileage:	6				

Table D-4.
Alternative: Proposed road decommissioning in the Bobar project area.

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type[1]	Control[2]	Possible Improvements: Depth (inches) and Type[3]	Seasonal Restriction[4] (for log hauling)
T39S R2W					
E1/2SW1/4 Section 30	0.50	NAT	BLM		1
T39S R3W					
NE1/4NW1/4 Section 11	0.40	NAT	BLM		1
SW1/4NE1/4 Section 11	0.10	NAT	BLM		1
E1/2NE1/4 Section 11	0.50	NAT	BLM		1
NE1/2SW1/4 Section 12	0.20	NAT	BLM		1
39-3-27.2D	0.80	NAT	BLM		1
SE1/4SE1/4 Section 24	0.20	NAT	BLM		1
NE1/4NE1/4 Section 25 and W1/2NW1/4 Section 30	0.40	NAT	BLM		1
E1/2NE1/4 Section 26	0.50	NAT	BLM		1
39-3-26.1	0.20	NAT	BLM		1
SW1/4SE1/4 Section 26 W1/2NE1/4 Section 35	0.90	NAT	BLM		1
39-3-27.0BC	1.20	NAT	BLM		1
39-3-27.1B	0.20	NAT	BLM		1
SE1/4NW1/4 Section 27sasa	0.10	NAT	BLM		1
NE1/4SW1/4 Section 27	0.10	NAT	BLM		1

Road Number	Approximate Length (miles)	Existing Surface: Depth (inches) and Type[1]	Control[2]	Possible Improvements: Depth (inches) and Type[3]	Seasonal Restriction[4] (for log hauling)
NW1/4SE1/4s Section 33	**0.10**	**NAT**	**BLM**		**1**
SW1/4NE1/4, NE1/4SW1/4 Section 35	**0.40**	**NAT**	**BLM**		**1**
S1/2NE1/4 Section 35	**0.40**	**NAT**	**BLM**		**1**
E1/2SW1/4 Section 36	**0.20**	**NAT**	**BLM**		**1**
40-2-5.5	**0.23**	**4"ABC**	**BLM**	**-**	**1**
Total Mileage:	7.13				

$ Natural Decommission - Some roads are presently well drained and have vegetation growing on them. They may also have trees and brush encroaching from the sides and trees that have fallen across them. Sections of these roads would be allowed to decommission naturally but may include some selective ripping, removal of drainage structures, construction of water bars and barricades.

$ Mechanical Decommission - Roads would be decommissioned mechanically. This would include ripping, removing drainage structures, seeding and/or planting, mulching, constructing water bars and barricades.

1. NAT = natural
2. BLM = Bureau of Land Management.
3. - = no improvement
4) 0 = no restrictions; 1 = hauling restricted between 10/15 and 5/15.

Bobar Landscape Project
Appendix E

Soils

SOIL #	SOIL NAME Present in Planning Area	Acres in Commercial Units	Ordination Symbol	EROSION HAZARD *, **	EQUIPMENT LIMITATION CONCERNS	SEEDLING MORTALITY CONCERNS	WIND THROW HAZARD	PLANT COMPETITION CONCERNS
--			--	--	--	--	--	--
1C	**Agebb**	**0**	8F	SLIGHT	MODERATE	MODERATE	SLIGHT	MODERATE
23A	**River Wash**	**0**	11S	SLIGHT	SLIGHT	MODERATE	SLIGHT	MODERATE
25G	**Caris-Offenbacher**	**804**		HIGH	SEVERE	MODERATE	MODERATE	MODERATE
26G	**Caris-Offenbacher**	**374.5**		HIGH	SEVERE	SEVERE	MODERATE	MODERATE
31A	**Central Point**	**1.1**		not rated	not rated	not rated	not rated	not rated
108B	**Manita**	**none**	6A	SLIGHT	MODERATE	MODERATE	SLIGHT	MODERATE
108D	**Manita**	**3.5**	6R	MODERATE	MODERATE	MODERATE	SLIGHT	MODERATE
108E	**Manita**	**8.3**	6R	MODERATE	MODERATE	MODERATE	SLIGHT	MODERATE
108F	**Manita**	**6.6**	6R	MODERATE	SEVERE	SEVERE	SLIGHT	MODERATE
113E	**McMullin**	**1.1**		not rated	not rated	not rated	not rated	not rated
113G	**McMullin**	**77.3**		not rated	not rated	not rated	not rated	not rated
133A	**Newberg**	**none**	11S	SLIGHT	SLIGHT	MODERATE	SLIGHT	MODERATE
154	**River Wash**	**none**		not rated	not rated	not rated	not rated	not rated
158B	**Ruch**	**none**	9A	SLIGHT	MODERATE	MODERATE	SLIGHT	MODERATE
158D	**Ruch**	**2.6**	9A	SLIGHT	MODERATE	MODERATE	SLIGHT	MODERATE
164B	**Shefflein**	**none**	9A	MODERATE	SLIGHT	MODERATE	SLIGHT	MODERATE
164D	**Shefflein**	**7.5**	9A	MODERATE	SLIGHT	MODERATE	SLIGHT	MODERATE
165E	**Shefflein**	**12**	7R	HIGH	MODERATE	MODERATE	SLIGHT	MODERATE
166E	**Shefflein**	**61.9**	7R	HIGH	MODERATE	SEVERE	SLIGHT	MODERATE
187A	**Takilma**	**0**		not rated	not rated	not rated	not rated	not rated
188E	**Tallowbox**	**16.8**	6S	HIGH	MODERATE	MODERATE	MODERATE	MODERATE
188G	**Tallowbox**	**258.4**	6R	HIGH	SEVERE	MODERATE	MODERATE	MODERATE

189E	Tallowbox	89.8	6S	HIGH	MODERATE	SEVERE	MODERATE	MODERATE

SOIL #	SOIL NAME Present in Planning Area	Acres in Commercial Units	Ordination Symbol	EROSION HAZARD *, **	EQUIPMENT LIMITATION CONCERNS	SEEDLING MORTALITY CONCERNS	WIND THROW HAZARD	PLANT COMPETITION CONCERNS
189G	Tallowbox	283.7	6R	HIGH	SEVERE	SEVERE	MODERATE	MODERATE
195E	Vannoy	50.2	6D	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
195F	Vannoy	239.9	6R	HIGH	SEVERE	MODERATE	MODERATE	MODERATE
196E	Vannoy	92.9	6A	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
197F	Vannoy-Voorhies	235	6R + 7R	HIGH	SEVERE	SEVERE	MODERATE	MODERATE
199C	Wolf Peak	none	8A	MODERATE	SLIGHT	MODERATE	SLIGHT	SEVERE
208C	Mine Tailings	none		not rated	not rated	not rated	not rated	not rated
W	Water	0		not rated	not rated	not rated	not rated	not rated

Ordination Symbol consists of two parts, a number and a letter.

i.e., potential productivity in terms of cubic meters of wood per hectare per year for the indicated species.
The letter is an indicator of potential problems as defined

A **No limits on this soil**
D **Rooting Depth**
R **Relief, steepness**
S **Sandy**

*** Erosion Hazard relates to the ease of detachment and movement of soil and rock particles, it is not meant to imply that this material has entered the aquatic environment, but rather the colluvial environment where it could remain for years to millennia. Almost all soils on hillslopes form in colluvium.**

**** This Erosion Hazard rating is from the Soil Conservation Survey completed in 1987, and may be different from ratings used by the USDA Forest Service *Soils Resource Inventory* (SRI), 1977, and the Landscapes at a Glance (LAG) system used in the *Little Applegate River Watershed Analysis* (USDI & USDA 1995) and the *Draft Little Applegate Watershed Assessment* (ARWC 2002).**

Soil #	Silvicultural Treatment	Acres	Total Acres
1C	DRY DOUGLAS FIR	0.0	0.0
23A	DRY DOUGLAS FIR	0.0	0.0
25G	DOUGLAS FIR POLES	16.5	
25G	DOUGLAS FIR REGENERATION	114.5	
25G	DRY DOUGLAS FIR	620.8	
25G	PINE SITE	42.5	
25G	WET DOUGLAS FIR	9.7	804.0
26G	DOUGLAS FIR POLES	16.4	
26G	DOUGLAS FIR REGENERATION	1.0	
26G	DRY DOUGLAS FIR	232.2	
26G	PINE SITE	124.7	
26G	WET DOUGLAS FIR	0.2	374.5
31A	DRY DOUGLAS FIR	1.1	
31A	PINE SITE	0.0	1.1
108D	DRY DOUGLAS FIR	0.2	
108D	PINE SITE	3.3	3.5
108E	DOUGLAS FIR POLES	0.0	
108E	DOUGLAS FIR REGENERATION	1.4	
108E	DRY DOUGLAS FIR	0.0	
108E	PINE SITE	6.9	8.3
108F	DRY DOUGLAS FIR	6.6	6.6
113E	DRY DOUGLAS FIR	1.1	1.1
113G	DOUGLAS FIR POLES	2.0	
113G	DOUGLAS FIR REGENERATION	0.1	
113G	DRY DOUGLAS FIR	45.9	
113G	PINE SITE	29.0	
113G	WET DOUGLAS FIR	0.3	77.3
158D	DRY DOUGLAS FIR	0.4	
158D	PINE SITE	2.2	2.6
164D	DRY DOUGLAS FIR	5.0	
164D	PINE SITE	2.5	7.5
165E	DOUGLAS FIR POLES	0.0	
165E	DRY DOUGLAS FIR	11.3	
165E	PINE SITE	0.7	12.0

Soil #	Silvicultural Treatment	Acres	Total Acres
166E	DOUGLAS FIR POLES	0.4	
166E	DOUGLAS FIR REGENERATION	3.8	
166E	DRY DOUGLAS FIR	26.1	
166E	PINE SITE	31.6	61.9
187A	DOUGLAS FIR REGENERATION	0.0	
187A	DRY DOUGLAS FIR	0.0	0.0
188E	DOUGLAS FIR POLES	16.8	16.8
188G	DOUGLAS FIR POLES	117.2	
188G	DOUGLAS FIR REGENERATION	33.1	
188G	DRY DOUGLAS FIR	89.4	
188G	PINE SITE	18.7	258.4
189E	DOUGLAS FIR POLES	70.0	
189E	DRY DOUGLAS FIR	17.6	
189E	PINE SITE	2.2	89.8
189G	DOUGLAS FIR POLES	120.7	
189G	DOUGLAS FIR REGENERATION	3.2	
189G	DRY DOUGLAS FIR	49.4	
189G	PINE SITE	110.4	283.7
195E	DOUGLAS FIR REGENERATION	9.4	
195E	DRY DOUGLAS FIR	40.8	
195E	PINE SITE	0.0	50.2
195F	DOUGLAS FIR POLES	11.5	
195F	DOUGLAS FIR REGENERATION	8.5	
195F	DRY DOUGLAS FIR	164.1	
195F	PINE SITE	55.8	239.9
196E	DOUGLAS FIR POLES	6.0	
196E	DOUGLAS FIR REGENERATION	1.4	
196E	DRY DOUGLAS FIR	56.2	
196E	PINE SITE	29.3	92.9
197F	DOUGLAS FIR POLES	51.6	

Soil #	Silvicultural Treatment	Acres	Total Acres
197F	DOUGLAS FIR REGEN	0.2	
197F	DRY DOUGLAS FIR	83.8	
197F	PINE SITE	99.4	235.0
W	PINE SITE	0.0	0.0

Bobar Landscape Project
Appendix F

ANALYSIS OF HOW THE BOBAR LANDSCAPE PROJECT IMPLEMENTS THE NORTHWEST FOREST PLAN AQUATIC CONSERVATION STRATEGY (ACS) OBJECTIVES

For the purposes of this ACS analysis, the hydrology and fisheries team defined "project scale" as encompassing the land within the project boundaries.

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

Individual Site Scale: By definition, landscape-scale processes and features cannot be analyzed at this tiny spatial scale.
Project Scale (HUC 6/7): At the project scale, the primary treatment objective is to restore landscape-scale processes and conditions. Although the response (of the vegetation for example) to the projects won't be immediate, over the long term silvicultural thinning, fire reintroduction and sediment source reduction should improve nutrient cycling, groundwater flow, riparian vegetation connectivity, large woody debris routing and many other spatially and/or temporally large features and processes.
Watershed Scale (HUC5): The beneficial effects of this project will be unnoticeable at the large spatial scale of the Little Applegate and Applegate/McKee Bridge watersheds.

2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

Individual Site Scale: At individual road-stream crossings, culvert work (pulling culverts and removing fill dirt on decommissioned roads or replacing old culverts with new culverts sized for 100-year events on renovated roads) will reconnect stream channels, encouraging natural patterns of flooding and flow.
Project Scale (HUC 6/7): Road decommissioning and blocking should reduce road-caused sedimentation over the long term and allow riparian vegetation to recolonize the road surfaces.
Watershed Scale (HUC-5): The beneficial effects of these actions at the individual site or project Scale would be unnoticeable at the large spatial scale of the Little Applegate and Applegate/McKee Bridge watersheds, due to the adverse impacts from historical and present-day activities, especially on private land.

3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

Individual Site Scale: In those Riparian Reserve areas where PCT facilitated long-term increases in instream large woody material, the larger material would help reestablish channel structure. On decommissioned roads, removing culverts and

pulling back fill dirt will allow the streams to reconfigure natural bank and shoreline structure.

Project Scale (HUC 6/7): Across the project, the no-treatment areas in the Riparian Reserves and Project Design Features (PDFs) will protect the physical integrity of stream channels.

Watershed Scale (HUC-5): The beneficial effects of these actions at the individual site or project Scale would be unnoticeable at the large spatial scale of the Little Applegate and Applegate/McKee Bridge watersheds, due to the adverse impacts from historical and present-day activities, especially on private land.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

Individual Site Scale: There would be no effect on water temperature, because shade would be maintained along all stream channels. Riparian Reserve PCT prescriptions only allow removal of very small-diameter understory, so the canopy will be maintained. Released trees may provide more shade as their canopies fill out, but the effects will probably be indiscernible. There may be some small amount of fine sediment entering stream channels at culvert removal or replacement locations; however, this small amount of fine sediment should not be above normal turbidity levels, if project BMPs and PDFs are implemented properly. In the one location where a new road crosses a stream channel, there is virtually no chance that there would be any changes to water quality resulting from this crossing installation, due to the stream characteristics at that site. (See Chapter 4, Hydrology and Fish sections of the Bobar Project EA for more detail.)

Project Scale (HUC 6/7): There would be no cumulative effect on water temperature at the project scale, because shade would be maintained along all stream channels. The likelihood of fine sediments produced from the upland projects (including road construction) is very low. Upland work (tree harvest, prescribed burning, new road construction, PCT) will have little effect on fine sediment levels, due to Riparian Reserve buffers, extensive PDFs designed to prevent overland sediment movement, and normal BMPs. In addition, the road renovation and decommissioning will reduce fine sediment at many locations across the project area, reducing the cumulative amount of fine sediments reaching stream channels downstream. Any sediment increases resulting from the proposed road work would be minor relative to existing sediment levels and would be offset by the substantial sediment decreased resulting from road renovation and decommissioning. This will ultimately benefit aquatic systems.

Watershed Scale (HUC-5): The beneficial effects of these actions at the individual site or project Scale would be unnoticeable at the large spatial scale of the Little Applegate and Applegate/McKee Bridge watersheds, due to the adverse impacts from historical and present-day activities, especially on private land.

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

See ACS Objective #4.

6. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

Individual Site Level: Any changes to instream flows cannot be discerned at this very small spatial scale.

Project Scale (HUC 6/7): The proposed road renovation and decommissioning would improve road drainage, ultimately improving the timing and magnitude of peak streamflows. None of the flow changes would be significant enough to improve habitat for fish.

Watershed Scale (HUC-5): Any effects on stream flow from this project would be too insignificant to be noticeable at this large spatial scale. Water withdrawals for agriculture and residential use and the Applegate Dam have the most significant impacts to mainstem river flows at this spatial scale.

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

Individual Site Level: There may be some very slight increases in water table elevation in meadows and wet areas due to the understory thinning in adjacent commercial units or conifer removal in hardwood stands. This slight increase would be restorative: changing the timing or amount of inundation to more closely resemble pre-fire suppression levels.

Project Scale (HUC 6/7)/Watershed Scale (HUC 5): Any possible effects at individual sites are too insignificant to be noticeable at these larger spatial scales. In addition, the adverse impacts from over a century of road network development, agricultural irrigation, and settlement in the Little Applegate and Applegate Rivers' floodplains dwarf any beneficial impacts from the Bobar Project.

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

Individual Site Scale: Riparian Reserve plant communities could improve in areas with PCT treatment. Trees should attain late-successional characteristics sooner, and in some treatment areas, riparian vegetation (i.e. shrubs, forbs) could become more structurally diverse.

Project Scale (HUC 6/7)/Watershed Scale (HUC 5): Any possible effects at individual sites are too insignificant to be noticeable at these larger spatial scales. In addition, the adverse impacts from over a century of road network

development, agriculture, settlement and riparian wood removal along the Little Applegate and Applegate Rivers' riparian areas and floodplains dwarf any beneficial impacts from the Bobar Project.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Individual Site Scale: In the long term, PCT should improve areas of poor quality for terrestrial riparian species and increase instream large wood recruitment in certain areas. Consequently, at these sites, habitat for both aquatic and terrestrial species should improve.

Project Scale (HUC 6/7): Riparian Reserves would maintain habitat for riparian-dependant riparian species. Commercial thinning would reduce the risk of riparian habitat loss from a severe, stand-replacing fire.

Watershed Scale (HUC 5): Any possible effects at individual sites are too insignificant to be noticeable at this larger spatial scale. In addition, the adverse impacts from over a century of road network development, agriculture, settlement and riparian wood removal along the Little Applegate and Applegate Rivers' riparian areas dwarf any beneficial impacts from the Bobar Project.

Bobar Landscape Project
Appendix G

Acronyms and Glossary

Appendix G
Acronyms and Glossary of Terms

Acronyms/Abbreviations

AMA - Adaptive Management Area
CT - Commercial thinning
CWD - Coarse Woody Debris
DBH - Diameter at breast height
GFMA - General Forest Management Area
IDT - Interdisciplinary team
LSR(s) - Late Successional Reserve(s)
LUA - Land Use Allocation
MBF - Thousand Board Feet
NEPA - National Environmental Policy Act
PCT - Precommercial thinning
RMP - Resource Management Plan
ROD - Record of Decision
T&E - Threatened and endangered (species)

Glossary

(From Medford District RMP)

Adaptive Management Areas - Landscape units designated for development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives.

Age Class - One of the intervals into which the age range of trees is divided for classification or use.

Allowable Sale Quantity (ASQ) - The gross amount of
timber volume, including salvage, that may be sold annually from a specified area over a stated period of time in accordance with the management plan. Formerly referred to as "allowable cut."

Anadromous Fish - Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Salmon, steelhead, and shad are examples.

Aquatic Ecosystem - Any body of water, such as a stream, lake, or estuary, and all organisms and nonliving components within it, functioning as a natural system.

Aquatic Habitat - Habitat that occurs in free water.

Biological Diversity - The variety of life and its processes.

Bureau Assessment Species - Plant and animal species on List 2 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040), which are identified in BLM Instruction Memo No. OR-91-57, and are not included as federal candidate, state listed or Bureau sensitive species.

Bureau Sensitive Species - Plant or animal species eligible for federal listed, federal candidate, state listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the State Director.

Candidate Species - Those plants and animals included in Federal Register "Notices of Review" that are being considered by the Fish and Wildlife Service (FWS) for listing as threatened or endangered. There are two categories that are of primary concern to BLM. These are:
Category 1. Taxa for which the Fish and Wildlife Service has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work. Category 2. Taxa for which the Fish and Wildlife Service has information to indicate that listing is possibly appropriate. Additional information is being collected.

Canopy - The cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multiple canopy (multi-layered) condition can result.

Climax Plant Community - The theoretical, final stable, self-sustaining and self reproducing state of plant community development that culminates plant succession on any given site. Given a long period of time between disturbances, plant associations on similar sites under similar climatic conditions approach the same species mixture and structure. Under natural conditions, disturbance events of various intensities and frequencies result in succession usually culminating as sub-climax with the theoretical end point occurring rarely of at all.

Coarse Woody Debris - Portion of tree that has fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter.
FEMAT

Commercial Thinning - The removal of merchantable trees from an even-aged stand to encourage growth of the remaining trees.
Connectivity - A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife and fish species.
Cover - Vegetation used by wildlife for protection from predators, or to mitigate weather conditions, or to reproduce. May also refer to the protection of the soil and the shading provided to herbs and forbs by vegetation.
Critical Habitat - Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species.
Cultural Resource - Any definite location of past human activity identifiable through field survey, historical documentation, or oral evidence; includes archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.
Cultural Site - Any location that includes prehistoric and/or historic evidence of human use or that has important sociocultural value.
Cumulative Effect - The impact which results from identified actions when they are added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.
Density Management - Cutting of trees for the primary purpose of widening their spacing so that growth of remaining trees can be accelerated. Density management harvest can also be used to improve forest health, to open the forest canopy, or to accelerate the attainment of old growth characteristics if maintenance or restoration of biological diversity is the objective.
Designated Area - An area identified in the Oregon Smoke Management Plan as a principal population center requiring protection under state air quality laws or regulations.
Developed Recreation Site - A site developed with permanent facilities designed to accommodate recreation use.
Diameter At Breast Height (DBH) - The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.
Ecosystem Diversity - The variety of species and ecological processes that occur in different physical settings.
Ecosystem Management - The management of lands and their resources to meet objectives based on their whole ecosystem function rather than on their character in isolation. Management objectives blend long-term needs of people and environmental values in such a way that the lands will support diverse, healthy, productive and sustainable ecosystems.
Endangered Species - Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.
Environmental Assessment (EA) - A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with National Environmental Protection Agency when no Environmental Impact Statement is necessary.
Environmental Impact - The positive or negative effect of any action upon a given area or resource.
Ephemeral Stream - Streams that contain running water only sporadically, such as during and following storm events.
Forest Canopy - The cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.
Forest Health - The ability of forest ecosystems to remain productive, resilient, and stable over time and to withstand the effects of periodic natural or human-caused stresses such as drought, insect attack, disease, climatic changes,

flood, resource management practices and resource demands.

Forest Land - Land that is now, or is capable of becoming, at least ten percent stocked with forest trees and that has not been developed for nontimber use.

Forest Succession - The orderly process of change in a forest as one plant community or stand condition is replaced by another, evolving towards the climax type of vegetation.

General Forest Management Area - Forest land managed on a regeneration harvest cycle of 70-110 years. A biological legacy of six to eight green trees per acre would be retained to assure forest health. Commercial thinning would be applied where practicable and where research indicates there would be gains in timber production.

Genetic Diversity - The variety within populations of a species.

Habitat Diversity - The number of different types of habitat within a given area.

Historic Site - A cultural resource resulting from activities or events dating to the historic period (generally post AD l830 in western Oregon).

Impact - A spatial or temporal change in the environment caused by human activity.

Intact Old Growth Habitat - Older forest types that have not been entered for logging or are lightly entered such that structural and functional characteristics of the forest are essentially unchanged, except in relation to the size of the habitat island, Typically, forests of coniferous series with crown closure above 70 percent. Also includes low site lands lacking the ecological potential to produce older forest habitat characteristics.

Intermittent Stream - Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Land Use Allocations - Allocations which define allowable uses/activities, restricted uses/activities, and prohibited uses/activities. They may be expressed in terms of area such as acres or miles etc. Each allocation is associated with a specific management objective.

Landing - Any place on or adjacent to the logging site where logs are assembled for further transport.

Landscape Diversity - The size, shape and connectivity of different ecosystems across a large area.

Landscape Ecology - Principles and theories for understanding the structure, functioning, and change of landscapes over time. Specifically it considers (1) the development and dynamics of spatial heterogeneity, (2) interactions and exchanges across heterogeneous landscapes, (3) the influences of spatial heterogeneity on biotic and abiotic processes, and (4) the management of spatial heterogeneity. The consideration of spatial patterns distinguishes landscape ecology from traditional ecological studies, which frequently assume that systems are spatially homogeneous.

Landscape Pattern - The number, frequency, size, and juxtaposition of landscape elements (patches) which are important to the determination or interpretation of ecological processes.

Late-Successional Forests - Forest seral stages which include mature and old-growth age classes.

Late-Successional Reserve - A forest in its mature and/or old-growth stages that has been reserved.

Log Decomposition Class - Any of five stages of deterioration of logs in the forest; stages range from essentially sound (class 1) to almost total decomposition (class 5).

Long-Term - The period starting ten years following implementation of the Resource Management Plan. For most analyses, long-term impacts are defined as those existing 100 years after implementation.

Long-Term Soil Productivity - The capability of soil to sustain inherent, natural growth potential of plants and plant communities over time.

Matrix Lands - Federal land outside of reserves and special management areas that will be available for timber harvest at varying levels.

Mature Stand - A mappable stand of trees for which the annual net rate of growth has peaked. Stands are generally greater than 80-100 years old and less than 180-200 years old. Stand age, diameter of dominant

trees, and stand structure at maturity vary by forest cover types and local site conditions. Mature stands generally contain trees with a small average diameter, less age class variation, and less structural complexity than old-growth stands of the same forest type. Mature stages of some forest types are suitable habitat for spotted owls. However, mature forests are not always spotted owl habitat, and spotted owl habitat is not always mature forest.

Mining Claims - Portions of public lands claimed for possession of locatable mineral deposits, by locating and recording under established rules and pursuant to the 1872 Mining Law.

Mitigating Measures - Modifications of actions which (a) avoid impacts by not taking a certain action or parts of an action; (b) minimize impacts by limiting the degree or magnitude of the action and its implementation; (c) rectify impacts by repairing, rehabilitating or restoring the affected environment; (d) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (e) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring - The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Multi-aged Stand - A forest stand which has more than one distinct age class arising from specific disturbance and regeneration events at various times. These stands normally will have multi-layered structure.

Multi-layered Canopy - Forest stands with two or more distinct tree layers in the canopy; also called multi-storied stands.

Multiple Use - Management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people. The use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife, fish, and natural scenic, scientific and historical values.

Neotropical migrants - a wide variety of bird species, which breed in temperate North America but migrate to tropical habitats in Central and South America during winter.

Noncommercial Forest Land - Land incapable of yielding at least 20 cubic feet of wood per acre per year of commercial species; or land which is capable of producing only noncommercial tree species.

Noncommercial Tree Species - Minor conifer and hardwood species whose yields are not reflected in the commercial conifer forest land ASQ. Some species may be managed and sold under a suitable woodland ASQ and, therefore, may be commercial as a woodland species.

Nonforest Land - Land developed for nontimber uses or land incapable of being ten percent stocked with forest trees.

Noxious Plant - A plant specified by law as being especially undesirable, troublesome, and difficult to control.

O&C Lands - Public lands granted to the Oregon and California Railroad Company and subsequently revested to the United States.

Off Highway Vehicle (OHV) - Any motorized vehicle capable of, or designed for, travel on land, water, or natural terrain. The term "Off Highway Vehicle" will be used in place of the term "Off Road Vehicle" to comply with the Purposes of Executive Orders 11644 and 11989. The definition for both terms is the same.

Old-Growth Conifer Stand - Older forests occurring on western hemlock, mixed conifer, or mixed evergreen sites which differ significantly from younger forests in structure, ecological function and species composition. Old growth characteristics begin to appear in unmanaged forests at 175-250 years of age. These characteristics include (a) a patchy, multi-layered canopy with trees of several age classes; (b) the presence of large living trees; (c) the presence of larger standing dead trees (snags) and down woody debris, and (d) the presence of species and functional processes which are representative of the potential natural community.

For purposes of inventory, old-growth stands on BLM-administered lands are only identified if they are at least ten percent stocked with trees of

200 years or older and are ten acres or more in size. For purposes of habitat or biological diversity, the BLM uses the appropriate minimum and average definitions provided by Pacific Northwest Experiment Station publications 447 and GTR-285. This definition is summarized from the 1986 interim definitions of the Old-Growth Definitions Task Group.

Old-Growth Forest - A forest stand usually at least 180-220 years old with moderate high canopy closure; a multilayered, multispecies canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

Old-Growth-Dependent Species - An animal species so adapted that it exists primarily in old growth forests or is dependent on certain attributes provided in older forests.

Operations Inventory Unit - An aggregation of trees occupying an area that is sufficiently uniform in composition, age, arrangement and condition to be distinguishable from vegetation on adjoining areas.

Optimal Cover - For elk, cover used to hide from predators and avoid disturbances, including man. It consists of a forest stand with four layers and an overstory canopy which can intercept and hold a substantial amount of snow, yet has dispersed, small openings. It is generally achieved when the dominant trees average 21 inches DBH or greater and have 70 percent or greater crown closure.

Overstory - That portion of trees which form the uppermost layer in a forest stand which consists of more than one distinct layer (canopy).

Partial Cutting - Removal of selected trees from a forest stand.

Peak Flow - The highest amount of stream or river flow occurring in a year or from a single storm event.

Perennial Stream - A stream that has running water on a year-round basis under normal climatic conditions.

Planning Area - All of the lands within the BLM management boundary addressed in a BLM resource management plan; however, BLM planning decisions applyonly to BLM-administered lands and mineral estate.

Plant Association - A plant community type based on land management potential, successional patterns and species composition.

Plant Community - An association of plants of various species found growing together in different areas with similar site characteristics.

Precommercial Thinning - The practice of removing some of the trees less than merchantable size from a stand so that remaining trees will grow faster.

Prescribed Fire - A fire burning under specified conditions that will accomplish certain planned objectives.

Priority Habitats - Aquatic, wetland and riparian habitats, and habitats of priority animal taxa.

Probable Sale Quantity (PSQ) - Probable sale quantity estimates the allowable harvest levels for the various alternatives that could be maintained without decline over the long term if the schedule of harvests and regeneration were followed. “Allowable” was changed to “probable” to reflect uncertainty in the calculations for some alternatives. Probable sale quantity is otherwise comparable to allowable sale quantity (ASQ). However, probable sale quantity does not reflect a commitment to a specific cut level. Probable sale quantity includes only scheduled or regulated yields and does not include “other wood” or volume of cull and other products that are not normally part of allowable sale quantity calculations.

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service or National Marine Fisheries Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

Public Domain Lands - Original holdings of the United States never granted or conveyed to other jurisdictions, or reacquired by exchange for other public domain lands.

Public Water System - A system providing piped water for public consumption. Such a system has at least fifteen service connections or regularly serves at least twenty-five individuals.

Reforestation - The natural or artificial restocking of an area with forest trees; most commonly used in reference to artificial stocking.

Regeneration Harvest - Timber harvest conducted with the partial objective of opening a forest stand to the point where favored tree species will be reestablished.

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act.

Right-of-Way - A permit or an easement that authorizes the use of public lands for specified purposes, such as pipelines, roads, telephone lines, electric lines, reservoirs, and the lands covered by such an easement or permit.

Riparian Reserves - Designated riparian areas found outside Late-Successional Reserves.

Riparian Zone - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Ripping - The process of breaking up or loosening compacted soil to assure better penetration of roots, lower soil density, and increased microbial and invertebrate activity.

Road - A vehicle route which has been improved and maintained by mechanical means to ensure relatively regular and continuous use. A route maintained solely by the passage of vehicles does not constitute a road.

Rotation - The planned number of years between establishment of a forest stand and its regeneration harvest.

Rural Interface Areas - Areas where BLM-administered lands are adjacent to or intermingled with privately owned lands zoned for 1 to 20-acre lots or that already have residential development.

Sanitation-Salvage Cuttings - Combination of sanitation and salvage cuttings. In sanitation cuts trees either killer or injured by fire, insects, disease, etc., are removed for the purpose of preventing the spread of insect or disease. Salvage cut remove trees that are either filled or severely injured before merchantable material becomes unmerchantable.

Scarification - Mechanical removal of competing vegetation or interfering debris prior to planting.

Seral Stages - The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. There are five stages:

Early Seral Stage - The period from disturbance to the time when crowns close and conifers or hardwoods dominate the site. Under the current forest management regime, the duration is approximately 0 to 10 years. This stage may be dominated by grasses and forbs or by sprouting brush or hardwoods. Conifers develop slowly at first and gradually replace grasses, forbs, or brush as the dominant vegetation. Forage may be present; hiding or thermal cover may not be present except in rapidly sprouting brush communities.

Mid-Seral Stage - The mid-seral stage occurs from crown closure to the time when conifers would begin to die from competition; approximately age 10 to 40. Stands are dense and dominated by conifers, hardwoods, or dense brush. Grass, forbs, and herbaceous vegetation decrease. Hiding cover for big game is usually present.

Late Seral Stage - Late seral stage occurs when conifers would begin to die from competition to the time when stand growth slows; approximately age 40 to 80. Forest stands are dominated by conifers or hardwoods; canopy closure often approaches 100 percent. Stand diversity is minimal; conifer mortality rates and snag formation are rapid. Big game hiding and thermal cover is present. Forage and understory vegetation is minimal except in understocked stands or in meadow inclusions.

Mature Seral Stage - This stage exists from the point where stand growth slows to the time when the forest develops structural diversity; approximately age 80 to 200. Conifer and hardwood growth gradually decline. Developmental change slows. Larger trees increase significantly in size. Stand diversity

gradually increases. Big game hiding cover, thermal cover, and some forage are present. With slowing growth, insect damage increases and stand breakup may begin on drier sites. Understory development is significant in response to openings in the canopy created by disease, insects, and windthrow. Vertical diversity increases. Larger snags are formed.
Old Growth - This stage constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again. (Also see definitions of old-growth conifer stand and potential natural community.)
These definitions are used by BLM to separate age classes for analysis of impacts.

Short-Term - The period of time during which the RMP will be implemented; assumed to be ten years.

Silvicultural Prescription - A professional plan for controlling the establishment, composition, constitution and growth of forests.

Silvicultural System - A planned sequence of treatments over the entire life of a forest stand needed to meet management objectives.

Site Class - A measure of an areas relative capacity for producing timber or other vegetation.

Site Index - A measure of forest productivity expressed as the height of the tallest trees in a stand at an index age.

Site Preparation - Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment which is favorable for survival of suitable trees during the first growing season. This environment can be created by altering ground cover, soil or microsite conditions, using biological, mechanical, or manual clearing, prescribed burns, herbicides or a combination of methods.

Skid Trail - A pathway created by dragging logs to a landing (gathering point).

Slash - The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging.

Smoke Management - Conducting a prescribed fire under suitable fuel moisture and meteorological conditions with firing techniques that keep smoke impact on the environment within designated limits.

Smoke Management Program - A program designed to ensure that smoke impacts on air quality from agricultural or forestry burning operations are minimized; that impacts do not exceed, or significantly contribute to, violations of air quality standards or visibility protection guidelines; and that necessary open burning can be accomplished to achieve land management goals.

Smoke Sensitive Area - An area identified by the Oregon Smoke Management Plan that may be negatively affected by smoke but is not classified as a designated area.

Snag - Any standing dead, partially-dead, or defective (cull) tree at least ten inches in diameter at breast height (DBH) and at least six feet tall. A hard snag is composed primarily of sound wood, generally merchantable. A soft snag is composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

Snag Dependent Species - Birds and animals dependent on snags for nesting, roosting, or foraging habitat.

Soil Compaction - An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Soil Displacement - The removal and horizontal movement of soil from one place to another by mechanical forces such as a blade.

Soil Productivity - Capacity or suitability of a soil for establishment and growth of a specified crop or plant species, primarily through nutrient availability.

Special Forest Products - Firewood, shake bolts, mushrooms, ferns, floral greens, berries, mosses, bark, grasses etc., that could be harvested in accordance with the objectives and guidelines in the proposed resource management plan.

Special Status Species - Plant or animal species falling in any of the following categories (see separate glossary definitions for each):
- Threatened or Endangered Species
- Proposed Threatened or Endangered Species
- Candidate Species
- State Listed Species

- Bureau Sensitive Species
- Bureau Assessment Species

Species Diversity - The number, different kinds, and relative abundance of species.

Stand (Tree Stand) - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjoining areas.

Stand Density - An expression of the number and size of trees on a forest site. May be expressed in terms of numbers of trees per acre, basal area, stand density index, or relative density index.

Stand-replacement Wildfire - A wildfire that kills nearly 100 percent of the stand.

State Listed Species - Plant or animal species listed by the State of Oregon as threatened or endangered pursuant to ORS 496.004, ORS 498.026, or ORS 564.040.

Stream Class - A system of stream classification established in the Oregon Forest Practices Act. Class I streams are those which are significant for: 1) domestic use, 2) angling, 3) water dependent recreation, and 4) spawning, rearing or migration of anadromous or game fish. All other streams are Class II. Class II special protection streams (Class II SP) are Class II streams which have a significant summertime cooling influence on downstream Class I waters which are at or near a temperature at which production of anadromous or game fish is limited. Revised Forest Practices Act may have a new system within a year.

Stream Order - A hydrologic system of stream classification based on stream branching. Each small unbranched tributary is a first order stream. Two first order streams join to make a second order stream. Two second order streams join to form a third order stream and so forth.

Stream Reach - An individual first order stream or a segment of another stream that has beginning and ending
points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of ½ to 1-1/2 miles in length unless channel character, confluence distribution, or management considerations require variance.

Structural Diversity - Variety in a forest stand that results from layering or tiering of the canopy and the die-back, death and ultimate decay of trees. In aquatic habitats, the presence of a variety of structural features such as logs and boulders that create a variety of habitat.

Succession - A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax. An example is the development of series of plant communities (called seral stages) following a major disturbance.

Suitable Woodland - Forest land occupied by minor conifer and hardwood species not considered in the commercial forest land ASQ determination and referred to as noncommercial species. These species may be considered commercial for fuelwood, etc. under woodland management. Also included are low site and nonsuitable commercial forest land. These lands must be biologically and environmentally capable of supporting a sustained yield of forest products.

Surface Erosion - The detachment and transport of soil particles by wind, water, or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in many rills, or by dry ravel.

Thermal Cover - Cover used by animals to lessen the effects of weather. For elk, a stand of conifer trees which are 40 feet or more tall with an average crown closure of 70 percent or more. For deer, cover may include saplings, shrubs or trees at least five feet tall with 75 percent crown closure.

Threatened Species - Any species defined through the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant
portion of its range and published in the Federal Register.

Timber Production Capability Classification (TPCC) - The process of partitioning forestland into major classes indicating relative suitability to produce timber on a sustained yield basis.

Transportation System - Network of roads used to manage BLM-administered lands. Includes BLM controlled roads and some privately controlled roads. Does not include

Oregon Department of Transportation, county and municipal roads.

Understory - That portion of trees or other woody vegetation which form the lower layer in a forest stand which consists of more than one distinct layer (canopy).

Viable Population - A wildlife or plant population that contains an adequate number of reproductive individuals to appropriately ensure the long-term existence of the species.

Viewshed - The landscape that can be directly seen from a viewpoint or along a transportation corridor.

Visual Resources - The visible physical features of a landscape.

Visual Resource Management (VRM) - The inventory and planning actions to identify visual values and establish objectives for managing those values and the management actions to achieve visual management objectives.

Water Quality - The chemical, physical, and biological characteristics of water.

Water Yield - The quantity of water derived from a unit area of watershed.

Wetlands or Wetland Habitat - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include, but are not limited to, swamps, marshes, bogs, and similar areas.

Wet Meadows - Areas where grasses predominate. Normally waterlogged within a few inches of the ground surface.

Wildlife Tree - A live tree retained to become future snag habitat.

Withdrawal - A designation which restricts or closes public lands from the operation of land or mineral disposal laws.

Woodland - Forest land producing trees not typically used as saw timber products and not included in calculation of the commercial forest land ASQ.

Bobar Landscape Project
Appendix H

Non Commercial Units

Proposed Non-Commercial Units in the Bobar Project Area			
Unit Number	**Acres**	**Plant Community**	**Treatment Method**
1	138	Woodland	Slashbuster and Manual
2	89	Woodland	Manual
3	25	Woodland	Manual
4	149	Woodland	Manual
5	41	Woodland	Manual
6	11	Woodland	Manual
7	61	Woodland	Manual
8	47	Grass	Manual
9	31	Woodland	Manual
10	45	Woodland	Slashbuster and Manual
11	7	Woodland	Manual
12	30	Grass	Slashbuster and Manual
13	7	Woodland	Manual
14	155	Woodland	Manual and Broadcast burn
15	28	Woodland	Manual
16	214	Woodland	Manual
17	39	Woodland	Manual
18	64	Woodland	Slashbuster and Manual
19	65	Woodland	Slashbuster and Manual
20	177	Woodland	Slashbuster and Manual
21	152	Woodland	Manual and Broadcast burn
22	133	Woodland	Slashbuster/Manual/Broadcastburn
23	92	Shrub	Broadcast Burn and Manual
24	38	Shrub	Slashbuster and Manual
25	94	Woodland	Manual
26	31	Woodland	Manual / Low Priority
27	43	Woodland	Slashbuster and Broadcast Burn
28	21	Woodland	Slashbuster/ Manual
29	16	Woodland	Slashbuster/Manual

General Prescriptions Guidelines for Bobar non-conifer treatments

Retention of hardwoods, including white oak, black oak, canyon live oak, madrone, mountain mahogany, and silk tassel will be an important element of prescriptions. All of these species are re-sprouters and slashing of the tree form will generally result in regrowth of a dense shrubby form. This is not a desirable outcome from the perspective of fuels reduction. Maintaining an intact hardwood overstory also supports the retention of native understory species (perennial bunchgrasses in particular) and helps keep noxious weeds from invading treatment sites. In many cases the hardwoods will represent a large percentage of remaining canopy cover after fuels treatments have been performed. It is expected that future maintenance burns or wildfire will remove a percentage of this hardwood overstory, while promoting growth of new age classes.

In mixed woodland/shrubland communities, slashing of shrubs will occur to reduce ladder fuels and overall fuel loading. Prescriptions will leave clumps of shrubs rather than single individuals. These clumps will be a variety of sizes and variably spaced from one another, depending on pre-treatment shrub density, hardwood density, wildlife needs, and the extent to which fuels removal is necessary in a particular location (i.e., proximity to homes). In many areas it appears that the hardwood component is being suppressed by an unnaturally dense shrub understory, and removal of shrubs should promote a more vigorous hardwood community in addition to meeting fuels reduction goals. The majority of treatments in mixed shrubland/woodlands will be accomplished manually, especially in areas with a high percentage of existing hardwood cover. Slashbuster treatments may be recommended in areas with a relatively small hardwood component and a dense understory of shrubs.

Chaparral communities in the Applegate include dense stands of buckbrush (*Ceanothus cuneatus*) and/or white-leaf manzanita (*Arctostaphylos viscida*) with very little or no hardwood overstory component. These communities are adapted to stand-replacement fires, as evidenced by their presence on dry, exposed slopes and the heat-induced germination of their seeds. Ecologically, the ideal treatment in these areas would be controlled burning during the summer or early fall, killing all or most individuals and initiating the growth of another generation. However, this is not feasible given the risks. Whenever it is deemed safe and appropriate by the fuels team, prescribed burn treatments in chaparral will be implemented in the fall or the spring. If prescribed fire is unsuitable, then prescriptions will recommend slashbuster treatments if the slope and soil type are appropriate. Manual treatments will be used if slope and/or soils are not suitable for the slashbuster. Manual or mechanical prescriptions in chaparral will designate the leaving of variable-sized clumps on variable spacing.

Native Bunchgrasses

In all cases, regardless of treatment method, seeding with native perennial bunchgrasses will be considered and implemented if deemed necessary. Observations of several treated units indicate that the presence of healthy bunchgrass populations before treatment is a major determinant in whether post-treatment sites will have native bunchgrasses. Because of this, priority for grass seeding is assigned to units with either no significant herbaceous understory or native seed bank (i.e., dense shrubland) or areas that have already been invaded by weedy species. Further research is needed to determine the effectiveness of seeding in these types of situations, but getting native seed on the ground is thought to be critical given the extent of current weed populations and their ability to quickly colonize disturbed areas.

Bobar Landscape Project
Appendix I

Summary of Cumulative Effects Considered

Bobar Cumulative Effects

The following table summarizes the cumulative effects considered in the Bobar Environmental Assessment. It is not meant to be a summary of all effects, rather a summary of the effects considered. See EA for specific effects related to each alternative.

Landscape and general cumulative effects were disclosed in the *Final Environmental Impact Statement for the Proposed Medford District Resource Management Plan* for projects that are within the description and design criteria of those described in the Plan (which includes Bobar, and are incorporated by reference).

Cumulative effects based on site specific actions for Bobar are described in detail in this environmental assessment.

Cumulative Effect/ Activity	**Analysis Boundary/ Analysis Type**	**Effects/Source**
		FEIS= Medford District Proposed Resource Plan Environmental Impact Statement *Listed by Alternative*
	Global Warming	
Global warming from activities proposed or anticipated on Medford District BLM and other western Oregon forest lands, including old growth timber harvest.	Western Oregon Forests (narrative)	**A/B/C**--The effect on global climate would be slight. (FEIS, 4-8)
	Vegetation	
Past fire suppression, logging and silvicultural practices on vegetative and biological diversity.	Medford District BLM (narrative)	**A/B/C**--Fire suppression, logging activities, and land development have resulted in fragmentation, decreased acreage in late seral and old growth, and increases in stand density, fuel loading, fuel continuities, and fire hazard. (FEIS, 3-17)
Current and past fire, logging, and development activities on landscape vegetation patterns and structure.	Bobar Analysis Area (narrative)	**A/B/C**--Landscape vegetation patterns are the result of topography, fires from 1864 to 1917, timber harvesting, and land development. (EA, pages 15-17)
Drought, road construction, insects, and private land management on outcome of proposed silivicultural treatments.	Bobar Analysis Area (narrative)	**A—**Tree mortality increases resulting in increased snags for cavity nesters, and fuel for wildfire. (EA page 47) **B/C**--Tree species will occur on sites they where they are best adapted; leaving untreated stands may increase insect epidemics;

		access via new roads will improve growth and vigor of thinned stands; and potential activities on private lands may increase forest fragmentation. (EA, pages 48-49)
Fire and Fuels		
Risk of catastrophic wildfire from forest vegetation management, drought, fire suppression, and accumulation of forest fuels.	Medford District BLM and adjacent lands (narrative)	**A/B/C**--Due to the continued increase in fuel hazard from forest management and cultural activities, conifer mortality associated with drought, and fire suppression, the risk of catastrophic wildfire remains high. (FEIS, 4-121)
Past fire suppression and management practices and current drought on wildfire size.	Bobar Analysis Area (narrative)	**A/B/C**--Increasing fuel loads due to fire suppression, drought, and past management practices contribute to larger fires over the past 20 years. (EA, page 15-16)
Current industrial, home, and prescribed burning activities' contribution to particulate matter.	Medford/Ashland Airshed (narrative)	**A/B/C**--Major sources of particulate matter are woodstoves, dust and industrial. Prescribed fire adds less than 4% of the annual total of particulates. (EA, page 17-18)
Proposed and future prescribed burning on particulate matter in relationship to home, agricultural, and industrial activities.	Medford/Ashland Airshed (narrative)	**B/C**--Prescribed burning complies with guidelines by the Oregon Smoke Management Plan and the Visibility Protection Plan which only allow activities to occur when particulate generation stays within acceptable limits. (EA, page 55-56)
Past, Present and Future treatments on potential wildfire behavior.	Bobar Analysis Area (narrative)	**B/C—**Combination of improved access, homeowner treatments and fuels treatments reduces potential fire behavior in Bobar and across landscape. (EA page 53-54)
Soil		
Soil compaction from road construction and ground based machinery, OHV, mining and recreation.	Medford District BLM (narrative)	**B/C--**Mitigation (management direction) and Best Management Practices would reduce potential compaction, bare soil exposure, yet there is an increase in risk of reducing soil productivity. (FEIS, 4-14)
Compaction and erosion from timber harvest, wildfire potential, fire suppression, and road construction.	Bobar Analysis Area (narrative)	**B--**Moderate short term increase in erosion; slight decrease in long term (EA page 56-57) **C**--It is unlikely there would be any noticeable effect from soil compaction caused by road construction, helicopter landing construction, and timber yarding methods. Erosion potential is reduced because destructive fire potential is reduced. (EA, page 59-60)

Surface erosion and landsliding from road and landing construction, timber harvest, machine piling and scarification, and broadcast burning.	Medford District BLM (narrative)	**B/C**--Mitigation (management direction) and Best Management Practices would reduce potential compaction, bare soil exposure, yet there is an increase in risk of reducing soil productivity. (FEIS, 4-14)
Hydrology		
Water quantity and quality from *past* ground disturbing activities: road and landing construction, timber harvesting, broadcast burning, mining, private land development and activities.	By Hydrologic Unit Code (HUC) 7 (quantitative and narrative)	**B/C**--Primary hydrological changes resulting from unnaturally high densities of small diameter trees and brushy vegetation. Summer stream flows have been reduced; channel morphology has been altered; flood events and debris flow risk increased; high erosion and sediment deposition in certain stream reaches; culvert erosion and failures. (Bobar EA, pages 30)
Water quantity and quality from *current and future* ground disturbing activities: road and landing construction, timber harvesting, broadcast burning, private land development and activities.	By Hydrologic Unit Code (HUC) 5 and 7 (quantitative and narrative)	**B/C**--Increased water temperatures, sediments from roads and private land activities, deficient large woody debris, watershed risk ratings remain high. (Bobar EA, pages 73-84)
Riparian habitat conditions for amphibians on BLM lands and other lands in the Medford District	Medford District BLM (narrative)	**A/B/C**--Cumulative effects of BLM actions and actions on other lands are unclear. (FEIS, 4-63)
Fisheries		
Timber harvest on federal and private lands, water quality changes, and loss of large woody material, riparian vegetation management on private lands on fish habitat.	Medford District BLM (narrative)	**A/B/C**--Greatest effect is an overall reduced level of large woody debris and habitat. Full recovery of fish habitat potential depends on a substantial conversion of riparian vegetation to conifers and the growth of these conifers to mature size large enough to remain stable in the stream channel over time. (FEIS, 4-65 to 4-67)
Past and current effects of mining, irrigation withdrawals, diversion dams, floodplain development, timber harvest, road building, removal of large wood, and grazing on fish habitat.	Bobar Analysis Area (narrative)	**A/B/C**--As a result of 140 years of mining, timber management, development, and water diversion, the Little Applegate and Applegate drainages have low degrees of sinuosity and low habitat diversity. (EA, page 39-40)
Future effects of activities in Bobar project on fish habitat.	Bobar Analysis Area (narrative)	**A—**Potential stand replacement wildfire will increase erosion and loss of streambank shade. (EA page 89-90) **B/C**--Riparian prescriptions, road decommissioning and road renovation will restore stream

		channel function. No cumulative improvement to fish habitat condition due to private land impacts. (EA, page 90)
Wildlife		
Timber harvesting and road construction on wildlife species associated with older conifer forests (total habitat; degree of fragmentation; and connectivity).	Medford District BLM (narrative)	**B/C**--It appears likely that species associated with older forests will be maintained. (FEIS, 4-55)
Timber harvesting on private land with expected results on BLM lands on coarse woody debris.	Medford District BLM (narrative)	**A/B/C**--Due to timber harvest on private lands, and low retention of coarse woody debris there, it is likely that lower populations of up to 67 species of wildlife will result. (FEIS, 4-60)
Timber harvesting on snag levels on BLM lands and other adjacent lands.	Medford District BLM (narrative)	**A/B/C**--Cumulative effects of actions on BLM and other lands are expected to maintain low-snag abundance and cavity-user populations. (FEIS, 4-61)
Habitat loss from federal and private timber harvest, pesticide use, and land development on neotropical migratory birds.	Medford District BLM (narrative)	**A/B/C**--In conjunction with habitat changes created by federal and private timber harvest and land development in the Pacific Northwest, and the pesticide use on wintering grounds, several species of neotropical bird species have experienced substantial population declines. (FEIS, 4-63)
Timber harvest and road building on sustainability of northern spotted owl.	Range of the Northern Spotted Owl (via consultation with the US Fish and Wildlife Service) (quantitative--by USFWS--and narrative)	**B/C**--Cumulative effects of activities in Bobar will not likely jeopardize the survival of the spotted owl as a species. (EA, page 91)
Past timber harvesting on suitable northern spotted owl habitat.	Range of the Northern Spotted Owl	**A/B/C**--Past logging could have already resulted in a significant loss of connectivity between physiographic provinces and consequent reproductive isolation. (FEIS, 4-75)
Timber harvest and development on BLM and other lands on northern spotted owl dispersal habitat.	Range of the Northern Spotted Owl	**A/B/C**--BLM checkerboard ownership pattern may yield cumulative dispersal habitat conditions that constitute less than 50% of the landscape. (FEIS, 4-77)
Timber harvest, road construction and private land development on biodiversity and species viability.	Bobar Analysis Area and Adjacent Landscapes (narrative)	**B/C—**Conditions resulting from treatments will contribute positively to biological diversity. (EA page 96)
Botany		
Recreation, timber harvest, road building, fire suppression and prescribed fire on the continued persistence of federally listed species.	Bobar Analysis Area (narrative)	**B/C**--Detrimental effects might occur from potential stand destroying fire occurs. New roads may lead to new fire starts resulting in stand destroying fire. (EA, pages 96-97)

Visual Resource		
Timber harvesting, road building, development of private land on visual effects.	Medford District BLM (narrative)	**A/B/C**--BLM's ability to affect any area's overall scenic quality depends to a large degree on land ownership patterns. (FEIS, 4-88)
Rural Interface		
Rural interface management effects upon neighbors from cumulative management actions (especially timber harvesting, burning, road construction, use of helicopters).	Medford District BLM (quantitative and narrative)	**A/B/C**--It is anticipated that allocating lands to timber production in the interface zone would create some level of controversy with communities or neighbors over how these lands are managed. (FEIS, 4-119)

Bobar Landscape Project
Appendix J

What is the AMA?

What Is the AMA?

Adaptive management and community involvement are emphasized within the context of sustained timber management.

The philosophy that led to the creation of the Northwest Forest Plan was guided by President Clinton's desire to develop a management strategy to protect old-growth related species and produce a sustainable level of timber *(ROD[1], page 3)*. The strategy is implemented by setting aside about 4 of every 5 acres for conservation **(within the range of the northern spotted owl)**, while allowing programmed timber harvest on the remaining acre.

The lands withdrawn from timber production (78% of the land **within the range of the northern spotted owl**) constitute the areas set aside for conservation of old growth related species *(ROD, page 2)*. These withdrawals include Congressionally reserved areas (wilderness, scenic rivers, etc.), late successional reserves (mature and old growth stands), administratively withdrawn lands (Areas of Critical Concern, natural research areas, etc.), and riparian reserves (lands along streams, lakes, aquatic systems, etc.).

Within the range of the northern spotted owl, programmed timber harvest occurs in the 22% of the land designated as matrix or adaptive management areas, and only in compliance with the standards and guidelines designed to achieve conservation objectives *(ROD, page 2)*. On matrix and AMA lands governed by the Oregon and California Lands Act, managers have the discretion to determine how to manage the forest on a sustained-yield basis that provides for permanent timber production over a long-term period. *(ROD, page 49)*

To verify the underpinnings of the Northwest Plan's conservation strategy, adaptive management areas were created to test and monitor approaches and effects of integrating sustained timber production with ecological, economic, and social/community objectives *(ROD, page 6).* The primary purpose of the ten AMAs is to encourage development of non-traditional techniques to meet management objectives. *(ROD, page 67)*

Primary management objectives for the Applegate AMA are: *developing and testing of forest management practices including partial cutting, prescribed burning, and low impact approaches to forest harvest (ROD, page D-12).* The percent of BLM lands in the Applegate AMA designated for programmed timber harvest is estimated to be 46%. Additional withdrawals are expected after site specific visits by resource specialists.

The *Applegate Adaptive Management Area Guide* suggests the strategies and actions by which questions about integration with ecological, economic, and social goals are addressed.

[1]ROD = the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl*